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NUMBER 1

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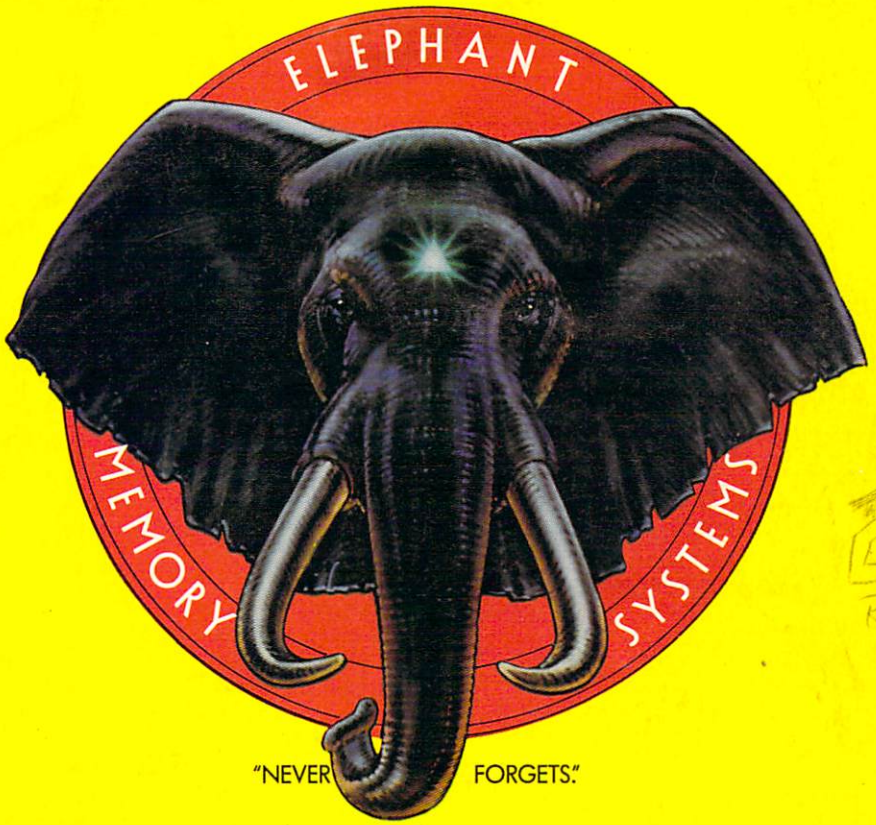

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FAMILY COMPUTING™

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PREMIER ISSUE
SEPTEMBER 1983

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VOLUME 1
NUMBER 1

PROGRAMMING

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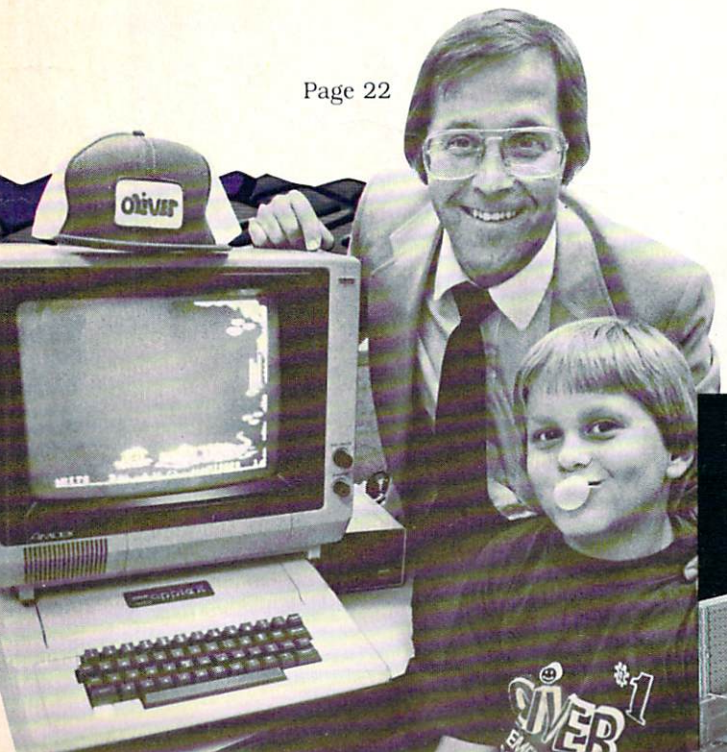
Page 22



Page 60

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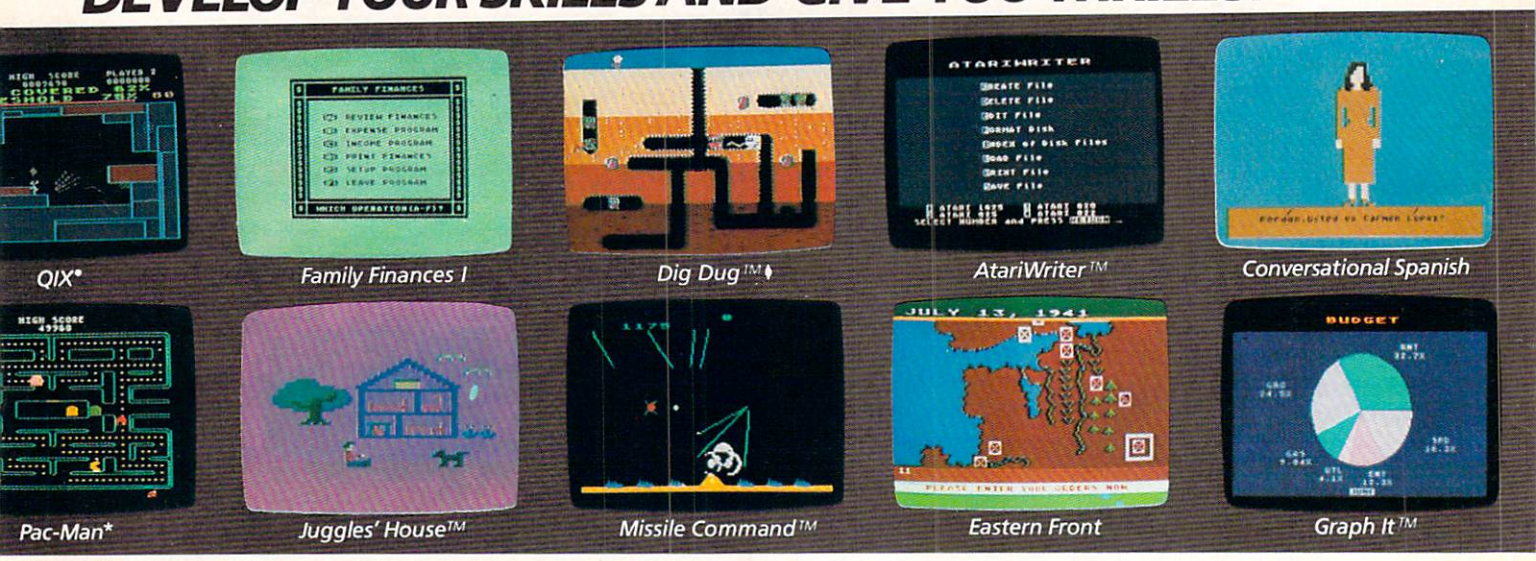

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* Rating by Queue, Inc., publishers of "Microcomputers in Education"

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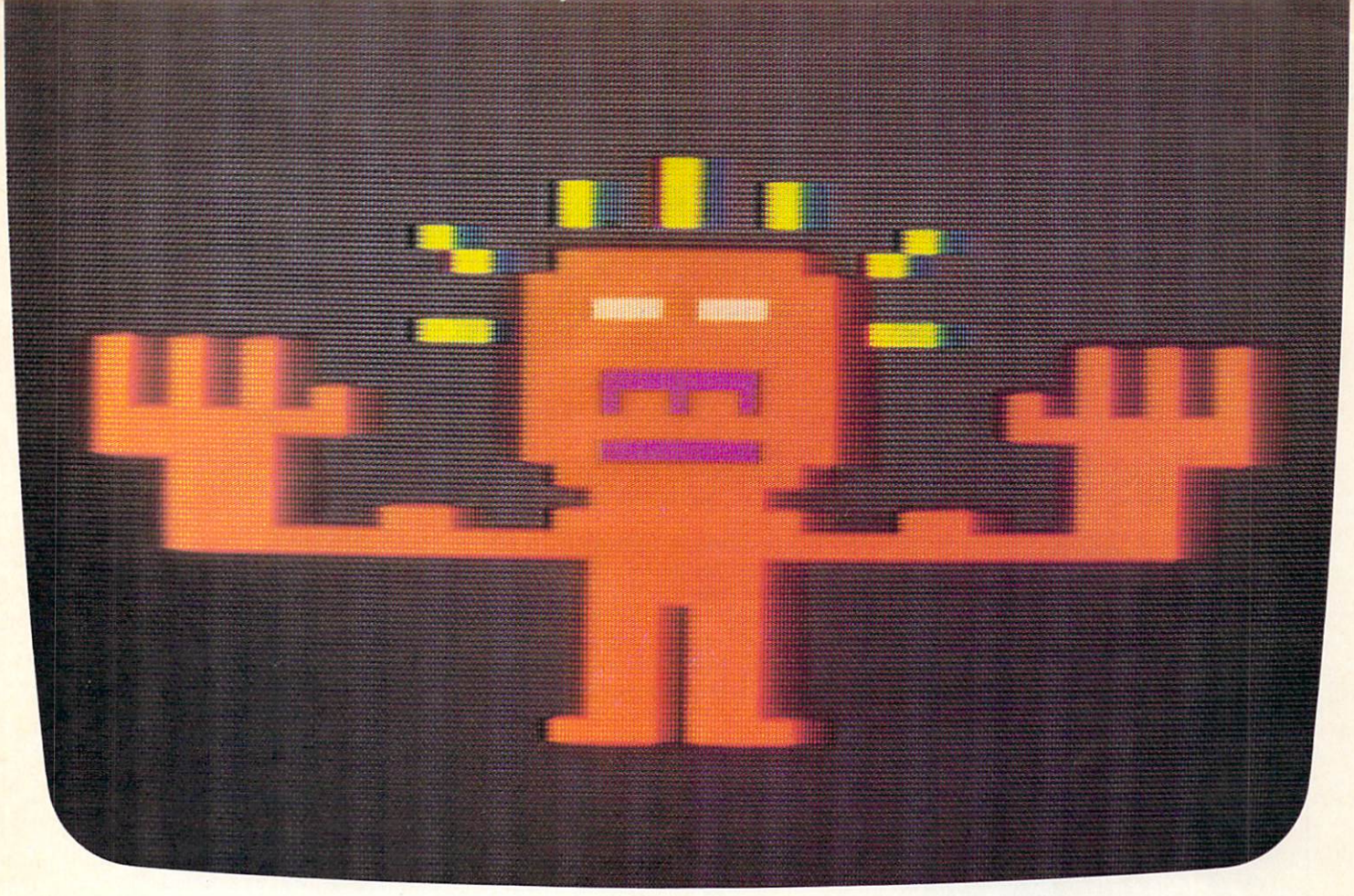

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EDITOR'S NOTE

JOIN US IN FAMILY COMPUTING

PHOTOGRAPH BY JANET BELLER

The more I read and write about microcomputers, the more I'm reminded of my grandfather. Thinking about him led to a major breakthrough in my own resistance to computers, which most authors and even technical experts at some time refer to as "machines."

If Martians had landed on Earth and tried to discover what Earthlings do, based on conversations with my grandfather, they would never have learned about the automobile. The word did not exist in the old man's vocabulary. Instead, sitting in his garage was "the machine," which he understood not at all, but which he greatly appreciated for somehow miraculously moving him and his friends and family wherever and whenever they wanted to go. The generations that followed him never questioned being automatically mobile, and the machine became the automobile, which became the car, which became brand- or model-specific as ownership within a single family multiplied and one car had to be easily distinguished from the others.

With the realization that we adults are a generation of beginners in relation to our computers, much as my grandfather was in relation to his automobile, it became easy to relax. We might never have reflexes as quick as the kids behind us, or understand the workings of "the machine," or use it as readily, but the computer is fast becoming part of our lives, and we are excited by the miraculous accomplishments we can achieve with it.

Our numbers are growing. Within just the next few years, 30 million families are expected to buy computers for their homes. The number-one motivating force behind this initial purchase is the future of our children. But the road to a buying decision and the successful assimilation of the computer into our everyday lives is a bumpy one, not clearly marked between the starting point and the final destination.

To help these families in the years ahead, and to serve those who have already bought computers, or who are looking for a way to feel comfortable as casual or recreational computer users, Scholastic Inc. has created FAMILY COMPUTING. It is a magazine that will serve as a guide while we toddle as eagerly as the very young and step as cautiously as the very old into the world of this new technology.

If you're one of the hundreds of thousands of people who've felt they had no place to turn for help, you'll find that at last there's a resource designed for you.

Every issue of FAMILY COMPUTING will be noted for:

A focus on people—families—who are putting their computers to good use;

How-tos and what-tos—the basics you need to know to get what you want from your computer. All in plain English;

Buying information on and reviews of software, hardware, and books directed to family purchasing;

Programming help—and a raft of programs for beginning and casual users of all ages and for seven different computer brands;

Ideas for tying your computer into the things you and your family are doing each month. Especially at holiday times;

Opportunities to contribute to FAMILY COMPUTING by sharing experiences with other readers, posing questions, writing articles, and submitting original programs, games, and puzzles you've created. We welcome your ideas.

So, if you're part of a computing family or a soon-to-be computing family, you'll find that issue after issue you'll be able to turn to FAMILY COMPUTING to meet your goals of learning about computers and learning to use computers. Confident that the expertise and experience of Scholastic Inc. are part of this new venture, you'll know you can count on us as you decide what to buy, where to buy, and what to do after you've made your decisions. You'll be able to lean on us if you're just giving programming a try. And we'll be there if you think you'd like to move on to word processing or information services, or even a second system with more power.

We'll be writing for a wide range of computing families, and a wide range of computing families will be writing for us. The stories about the successes of our readers will be proof of the success of computers themselves.

Claudia Cohl

CLAUDIA COHL
EDITOR-IN-CHIEF

Apple*, Commodore*, Timex/Sinclair* . . .

by William B. Sanders

The idea of getting your own computer sounded wonderful. But now that you have it you're a little scared . . . you think it sounds so technical. Well, take heart. Relax. Help is here. William B. Sanders has written individual books about the Apple, the Commodore 64, and the Timex/Sinclair computers. When you select the one which matches your computer you can breathe easy because it'll be like having your all-time favorite teacher at your side . . . gently guiding you, explaining, and showing.

THE ELEMENTARY series sweeps away the confusion and explains your Apple, Commodore 64 or Timex/Sinclair in down to earth terms, coupled with enjoyable cartoons. It shows you how to hook it up, how to use the keyboard and work on the screen—all the unique things your computer can do so you can make use of it right away! And it also answers those questions you'll have about how to write your own simple programs, about graphics, utility programs, and various hardware options.

You'll see your ELEMENTARY book contains a lot of information. And, you'll also see that not one paragraph or chapter is dull or difficult to follow. Prove it your yourself. Visit your computer store. Open the book. Read a page of the introduction, then flip to any page and read a paragraph or so. You'll find it's as understandable, as helpful and as marvelous as we say.

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BEHIND THE SCREENS

PEOPLE, NEWS, AND TRENDS

EDITED BY JOHN WALLACE

Hope for the Weary

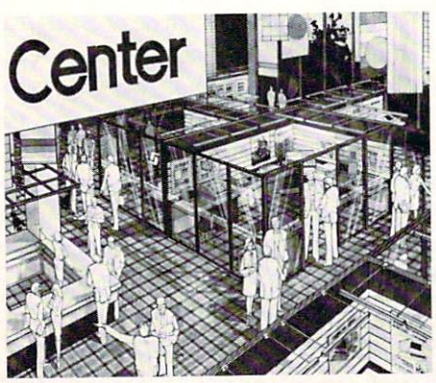
Those of you who tremble at the thought of embarking on a comparative computer hunt or panic at the prospect of purchasing a peripheral may take heart at the arrival of the Computer Technology Center. Announced to open in Los Angeles later this fall, it is a pair of 10-story towers, the first floors of which will house an anticipated 100 computer display rooms.

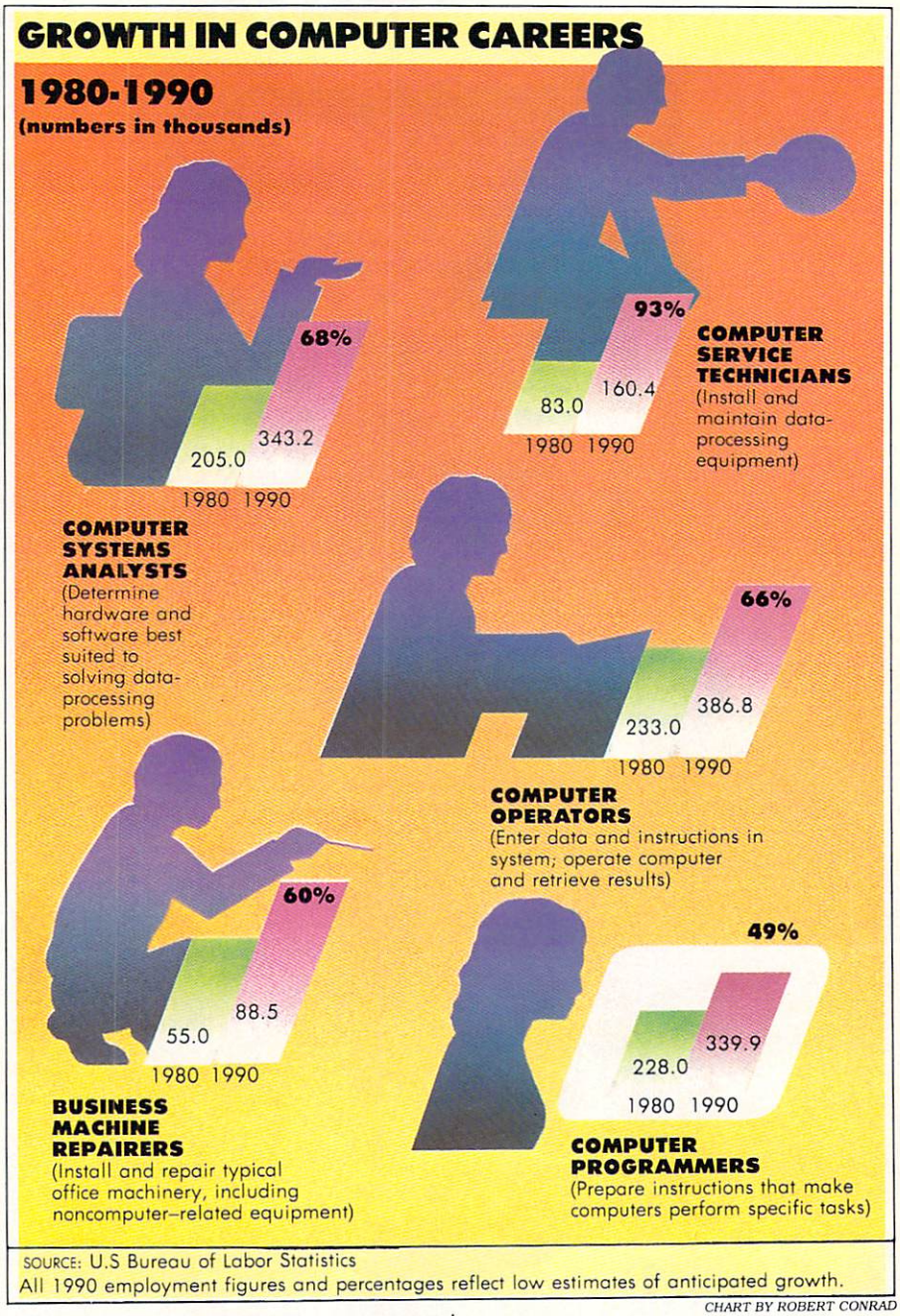
The promise of centers like these is that they will enable buyers to browse and sample hardware in peace. There will be no high-pressured salespeople, although manufacturer reps will most certainly promote their products. And there will be a wide variety of different brands under one roof.

Real estate developers and other entrepreneurs all over the country are planning centers in as many as 13 cities, including Cincinnati, Atlanta, and Philadelphia. Showrooms are already in place in existing buildings in Chicago and Westminster, California.

"Most of the major companies are putting their toes in the water," explains Mary Simpson, an analyst at the marketing research firm, Dataquest. She says that, just like any new marketing concept, "these marts have had a rather limited acceptance at first." Some industry observers say that big micro manufacturers are reluctant to subject their wares to the kind of intense comparative scrutiny that such computer marts would invite.

To the weary consumer, though, the concept of a one-stop computer mart sounds good, a possible detour around that shopping center scramble.





SOURCE: U.S Bureau of Labor Statistics
All 1990 employment figures and percentages reflect low estimates of anticipated growth.

CHART BY ROBERT CONRAD

Where to Find Jobs

"The computer is changing the character of employment in the United States," says Steve Jobs, chairman of Apple Computer. Indeed, as layoffs in the manufacturing industries continue, and accounting and bookeeping jobs decline, computer-related positions are expected to grow well over 50 percent by 1990. Well-trained computer programmers, operators, technicians, and systems analysts should have a wide range of opportunities from which to choose (see chart). In addition, there will be numerous new jobs in development and sales at computer-manufacturing companies, since sales of personal computers are expected to soar 700 percent by 1987. Jobs will also abound in computer-software development.

continued on page 12

WHILE OTHER COMPUTER COMPANIES ARE BUSY SETTING NEW PRICES, SPECTRAVIDEO IS BUSY SETTING NEW STANDARDS.

MSX™ and LOGO™: Two more reasons why Spectravideo is leading the way in Personal Computers.

While price wars and confusion reign all around us, Spectravideo goes about its business, setting standards by which all other personal computers will soon be judged. MSX and LOGO are the two latest examples of how Spectravideo is rocking–and reshaping –the personal computer industry.

MSX AND LOGO.

It is now history that, on June 15 1983, Spectravideo, Inc. joined with most of Japan's largest electronics firms to launch MSX: The most far-reaching personal computer standard in history. MSX is the name given to a specific hardware/software configuration that makes product interchangeability possible. While Spectravideo is proud to participate in MSX, we are even prouder of this fact: It was our own SV-318 computer that was used as a prototype for the MSX design! There are two important aspects to this.

First, all future MSX hardware–i.e. computers, peripherals, appliances–will be based on several key design elements of the SV-318. What does this mean to you, the consumer? A great deal, because when you buy an SV-318, you will not only be able to use all of Spectravideo's own software and hardware–you'll also be able to take advantage of all the remarkable new equipment that will be coming from other MSX participants.

In addition, the software aspect of MSX was largely inspired by the software built into the SV-318. From the outset, Spectravideo offered built-in Microsoft BASIC as its resident interpreter. Now, Microsoft also makes a LOGO program compatible with the SV-318. It was Spectravideo's Microsoft BASIC/LOGO that helped to make MSX possible.

Another standard that Spectravideo can take credit for is the built-in Joystick/Cursor Control. Built right into the SV console, this control is always at fingertips and is much easier and faster to use than external joysticks or conventional editing controls. Certain engineering elements that helped to make this built-in control possible have also been incorporated into MSX.

OTHER STANDARDS OF EXCELLENCE.

While these are the computer standardizations that Spectravideo helped to initiate, they by no means represent the whole SV-318 story. This remarkable computer has also established many standards of excellence that other personal computers now aspire to:

- ***Built-In Super Extended Microsoft BASIC***–*Makes the SV-318 the first truly programmable affordable computer!*
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- ***More Available Software***–*Built-in CP/M compatibility gives you immediate access to over 3000 existing software programs. Plus, you can utilize Spectravideo's own fine software library.*
- ***Advanced Graphics Capabilities***–*The SV-318 offers 16 colors in high resolution, and more importantly, 32 programmable sprites that allow tremendous control of movable screen objects.*
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BEHIND THE SCREENS

continued from page 10

All in the Cards

Bad news for those of us who have enjoyed—perhaps too much—the ease of credit card use. Thanks to the latest microcomputer innovations, a French company now has a new kind of card in its deck.

One quarter of a million people in Lyons, Caen, and Blois, France, are trying out a special kind of credit card that contains a mini-microcomputer chip. These "Smart Cards" are more clever than many shoppers might like. They know exactly how much money you have and won't let you spend a penny—or a franc—more.

The card is designed to do a good deal more than keep you within budget. It has enough memory to handle 100 transactions, and can serve as an instant cash card, travelers' card, telephone credit card, social security card, medicaid card, immigration card, and probably any other card you might carry in your wallet.

The card, which a user inserts into a monitor or "reader" in order to access the information stored in the chip, has many potential applications besides its capacities as a glorified credit or ID card. It could, for instance, greatly aid emergency medical diagnosis. "Someone's entire medical history would be carried on the card," explains a publicist for Smart Cards. "If a person collapses, the card will indicate what sort of medication might be needed." Police and hospitals would be equipped with the readers, which, like those found in retail outlets, would read out the information stored on the chip.

In the U.S., the Army has been testing similar versions of these cards. As forms of identification, these Smart Cards would hold a soldier's complete medical and personnel history, greatly facilitating the Army's record-keeping procedures. (In war time, such information could be easily erased for the soldier's—or the nation's—protection.) Elsewhere in the U.S., such chips are being tested for their potential use in food stamp vouchers.

All told, the possible uses for these Smart Cards are limitless. Who knows? Perhaps years from now, you won't be leaving home without them.

Whiz Punks

CBS's new TV adventure series, "Whiz Kids," features four high school students whose computer savvy helps them solve mysterious crimes. Along with the movie, *WarGames*, it is the second drama out of L.A. to depict computer kids gaining unauthorized access to confidential computerized corporate, government, or school files.

The show's star whiz kid, Richie, and his friends solve their first murder mystery by using their programming prowess to break into a variety of computer systems. Objections have been raised about the TV network's promotion of this kind of online liberty taking.

Admittedly, the whiz kids' know-how "is a poor role model for young people," says Harvey Shephard, senior vice president of the CBS entertainment division. The show's producer, on the other hand, maintains the show is harmless because it neither endorses the kids' line tapping, nor demonstrates how it is done.

Neither the whiz kids nor the war gamesters are evil people. (*WarGames*, if you don't know, is about a kid who inadvertently taps into the Pentagon's war strategy computer.) They are essentially good guys; they right wrongs and apprehend criminals. But they do commit some electronic indiscretions, and in so doing, raise some questions about the ethical limitations of hacker heroics.

What's in a Name

Computers are taking the world by storm. Maybe that's why they call the computer *o kosmos* in Greece. Translated literally, that means "order" or "universe." Not every language has adapted so eloquently to the new technology.

Most countries just use variations on the English "computer." According to Frank Anshen, professor of linguistics at New York University, this is commonly the case with words for new technologies or trends. "When people take a new machine, or a new concept, they generally take the word, too. Americans are way ahead with computers."

The Japanese, for instance, have adopted the standard English word, as have the Germans, who occasionally clarify pronunciation by spelling it with a "k." Egypt and Afghanistan follow suit.

European countries display a certain amount of linguistic pride. Italians use the word *elaboratore*, which means "processor," while the French employ the term, *ordinateur*, which derives from the verb *ordiner*—to count.

The Finnish are more like the Greeks when it comes to linguistic ingenuity. The definition for "hacker" in Finland is one who spends too much time in front of his or her *tietokone*, the word for "knowledge machine." They've got the general idea.

Kenya has a novel solution. Instead of bothering to make up a whole new word for the creature, they just modified the spelling a bit. "We pronounce it as the British do," an official at the Kenyan consulate explained, "and we spell it as it is pronounced—'c-o-m-p-u-t-a.' "

Well, we say computer, they say computa, let's not call the whole thing off!

If you've got a good bite-sized piece of computer-related news involving people, trends, or innovations, let's hear it. We will pay $25 for each item we publish. Write to Behind the Screens, *c/o* FAMILY COMPUTING, *730 Broadway, NY, NY 10003.*

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THE PRIMER

The only way to learn to use a computer is to use one. But before you start, it's well worth asking, "What can I do with a computer?" And, "How does a computer work?"

The illustration of a computer system on the opposite page shows various pieces of equipment, referred to as hardware. To work effectively, this hardware needs step-by-step instructions, or programs. These programs are often called software. What you can do with a computer depends on the software you use.

The many uses of home computers can be broken down into several broad categories.

WHAT A COMPUTER DOES

Game Playing. Several types of games are available—arcade-style action, fantasy, adventure. Some take minutes to master; others months. Many games can be played by more than one person at a time.

Education. Whether you are learning math, French, history, or typing, these programs allow you to learn at your own pace. Programs range from question-and-answer drills to loose creative exercises. Some test logical skills, by putting you in a real-life problem-solving situation; others teach you to program by letting you draw pictures.

Paper work. When it comes to handling reams of information, the computer can't be beat. It functions as an endless supply of paper, file cabinets, and a calculator rolled into one. With an electronic spreadsheet, you can change one figure in a budget and the rest will automatically change. The ability to ask "what if?" and see immediate results has obvious time-saving benefits.

The computer is equally adept at setting up a filing system, and allows you to cross-reference data in any number of ways for easy recall.

With a word-processing program, the computer can speed up and simplify the writing process, by allowing you to change or rearrange words and paragraphs without retyping.

Information access. You can hook your home computer, via the telephone, to much larger computers at "information service" companies. This allows you to "call up" stock quotations, airline schedules, newspaper and magazine bibliographies, encyclopedias, and even games.

Also, by using the telephone lines you can hook your computer to other home computers around the country, and leave or receive messages. This practice is known as electronic mail. Several computers linked together are called a network.

Programming. It's possible to enjoy practical benefits from your computer without ever buying a commercial program—you can write your own. And, in some cases, you can adapt commercial programs to better suit your particular needs.

HOW A COMPUTER WORKS

The computer is an information-handling machine. It stores, compares, changes, and manipulates information of almost any kind at tremendously high speeds.

The computer's operating method can be boiled down to four simple steps. (1) INPUT: Instructions and information, in the form of a program and data, are entered into the computer. (2) PROCESSING: The computer executes the steps of the program. (3) OUTPUT: The results of the computer's work are made visible and available to the user. (4) STORAGE: Results can be stored and saved.

Most home computers do not come ready-made in one piece, but must be assembled from various components. Following are the components needed for each of the four operating steps, and how they work.

Input. There are four basic ways of getting a program and/or other information into a home computer.

KEYBOARD. The keyboard looks and behaves much like that of a typewriter. Some keyboards have special keys for certain computer functions, and some have a numeric keypad, much like a calculator. But on any unit, every keystroke you type goes directly into the computer's memory. That information will stay there until you delete it or turn the computer off. (You can also store, or save, that information for future use.)

CASSETTE TAPE RECORDER. You can copy a program stored on a cassette tape directly into the computer's memory. Regular tape recorders and cassettes can be used with most home computers, although you will need a special cable to connect the two. Once connected, you merely type a simple command to transfer the program from tape to computer.

DISK DRIVE. The transfer method is much the same with a disk drive, except that the program is stored on a floppy disk, which looks much like a 45 rpm record.

The disk drive enters programs much more quickly and with less chance of error than the cassette recorder. But the cassette recorder is significantly cheaper.

CARTRIDGE. A cartridge, which plugs into a slot built into some computers, also stores programs. Putting a cartridge into a computer actually adds memory to the computer—and that memory contains a program.

Processing. All input goes to the Central Processing Unit (CPU), located underneath the keyboard. The CPU is a maze of tiny electronic circuits, but it functions as a giant.

The CPU controls the flow of information into, out of, and inside the computer. The computer's memory, where information is stored, is located in the CPU. The CPU also interprets a program, performs each of its steps, and then sends the results to the user.

Output. The visible result of a CPU's work is called output. Output is made available on the screen of a TV or monitor, or from a printer.

Computers can be hooked to TVs or monitors, and to printers. In all cases special cables are required. In general, the monitor's screen display is sharper than the TV's.

Storage. When the computer is turned on, it will store and remember all information it receives. But when it is turned off, this information will vanish—unless you instruct the computer to save it.

You can store information on a blank tape or disk. Either way, you can record the results of the computer's work, just as you would record a speech. Then, any time you want to run that program again, you can transfer it into the computer's memory, and see it on the display screen.

You cannot store new information on a cartridge.

Peripherals. Peripherals are optional pieces of equipment that can be added to your computer, but are not crucial to the computer's operation. A printer, in fact, is considered a peripheral. One of the most popular peripherals is a modem.

MODEM. If you want to link your computer to an information service or other computers, you will need a modem. A modem holds a telephone receiver and transmits and receives data through phone lines.

Remember that the computer is a tool. As with all tools and machines, there is no need to know everything about how a computer works. All you need to know is how to use it for your own purposes.

ILLUSTRATIONS BY RICHARD TIMPERIO

THE PRIMER
THE WORDS

The Words is a glossary of commonly used computer terms. Some are well-known English words, such as *read* and *write*, that have been incorporated into computer language and given different meanings. (Note: All italicized words in the definitions are defined in full elsewhere in the glossary.) Other terms that refer to a computer's inner workings are not often used in common speech, but are important because they are used in manufacturers' specifications and ads. Don't be awed by them. Remember the delight with which Americans took to the new NASA language over 20 years ago, when John Glenn first vaulted into space.

Access
To retrieve information from a storage place in the computer system. Access time is the amount of time it takes to obtain the information.

Address
A specific location in the computer's *memory* where a piece of information is stored. Each address is identified by a number.

Applications software
Programs that instruct the computer to perform one task or a group of related tasks, such as keeping track of a household budget, or the accounting and inventory of a business.

BASIC
Beginner's All-purpose Symbolic Instruction Code. A popular, easy-to-learn *programming language* widely used with *microcomputers*.

Baud
Bits per second. A unit of measurement that describes the rate at which *data* are transmitted from one device to another, such as computer to *printer*, computer to computer, or computer to *terminal*.

Binary code
A number system using only two digits, "0" and "1." Any number or letter can be expressed as a combination of these digits. Computers use the system by translating each *character* of information into a string of binary numbers.

Bit
The smallest unit of information a computer uses. A bit is either the digit "0" or "1." An "eight bit" processor manipulates *data* in clusters of eight bits.

Board
Printed circuit board. A flat, thin rectangular component of a computer that includes one or more layers of printed circuitry and to which *chips* and other electronic parts are attached. As an add-on to an existing computer, sometimes called a card.

Boot
Derived from "bootstrap." To start or restart a computer system by *reading* instructions from a storage device into the computer's *memory*.

Bug
An error in the logic of a computer *program* that prevents it from running properly. Bugs can cause a program to "freeze up," that is, to repeat the same operation endlessly. Finding and correcting the error is called debugging.

Bus
A device that connects components of a computer so that *data* can flow between them. There are several conventional buses that allow components made by different manufacturers to be used in the same computer.

Byte
One byte contains eight *bits*, enough to stand for one *character* of English, or one number. Thus, it generally takes more than one byte to make up a word. "Cat," for instance, requires three bytes.

CAI
Computer Assisted Instruction. A term applied to a wide range of instructional *software*, including drill-and-practice, simulation, and educational games.

Cartridge
A device that stores a prerecorded *program*. A cartridge is inserted into a special slot built into the computer. Also known as a solid state cartridge or *ROM* module.

Cassette tape recorder
Computer cassette recorders are usually the same as those used for audio recordings, but often need a special cable to connect them to the computer. They house and run magnetic tapes that either hold a prerecorded *program* or store *data* from the computer.

Character
A letter, number, or symbol.

Chip
A small (about the size of a child's fingernail) component that contains a large amount of electronic circuitry. Chips are the building blocks of a computer and perform various functions, such as doing arithmetic, serving as the computer's *memory*, or controlling other chips.

Command
An instruction that tells the computer to do something, such as to run a *program*.

Compatibility
The ability of different devices, such as a computer and a *printer*, to work together; or the ability of a particular *program* to run on a given computer. In short, the ability of anything in a computer system to work with anything else.

CP/M
Control Program for Microprocessors. A widely used *operating system* for microcomputers.

CPU
Central Processing Unit. The "heart" of a *microprocessor*, with components that control the interpretation and execution of instructions.

CRT
Cathode Ray Tube. A TV or TV-like *monitor* used to display information and pictures. Also called a computer screen.

Cursor
A symbol, usually a small square, that indicates where the next *character* will appear on the CRT screen.

Data
Information put into or taken out of a computer.

Data bank
A central location for storing vast amounts of information accessible by computer.

Data-base manager
A *program* that allows the user to enter, organize, sort, and retrieve information.

Disk
A magnetic device for storing information and *programs* accessible by a computer. A disk can be either a rigid platter (hard disk) or a sheet of flexible plastic (floppy diskette). Disks have tracks, much like grooves on LP records, where *data* is stored.

Disk drive
A device that *reads* information from a *disk* and copies it into the computer's *memory* so that it can be used by the computer, and that *writes* information from the computer's *memory* onto a *disk* so that it can be stored.

Documentation
The written instructions that explain how to use computer *hardware* or *software*. Also refers to all instructions and remarks, used to describe procedures when programming.

DOS
Disk Operating System. See *operating system*.

Downtime
Time when a computer is not working.

Electronic mail
The transmission of messages, documents, or other information from one computer user to another. This can be done over telephone lines using devices called *modems*.

Emulator
A *hardware/software* device designed to translate *programs* written for one particular computer so that they will run on another computer.

Firmware
Programs or *data* stored in *ROM*—either built-in by the manufacturer, or added with a cartridge—that cannot be changed by the user.

Flow chart
A diagram on paper that shows all the logical steps necessary to write a *program*.

Format
To prepare a *disk* so that it can receive and store information. Until you perform this task, the *disk* will not be able

continued on page 19

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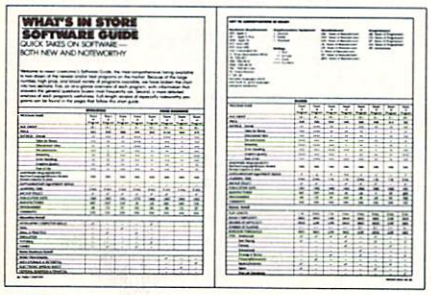

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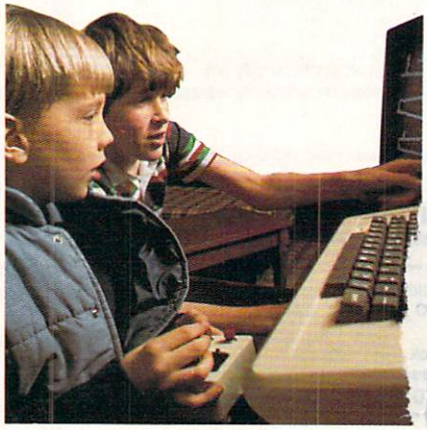

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THE PRIMER
THE WORDS

continued from page 16
to store any information. The word "initialize" is often used to mean the same thing as format.

Function key
A special key on the computer's *keyboard* that has been or can be designated to perform a specific task.

Graphics
Pictorial displays on the *CRT*, such as charts, graphs, and symbols. Contrasted with *text*.

Graphics tablet
A kind of electronic drawing board. With a graphics tablet and a special pen, whatever you draw will appear simultaneously on the *CRT*.

Hard copy
Information printed by the computer onto paper.

Hardware
The physical, nonchanging parts of a computer system. Contrasted with *software*, or *programs*, which can change.

High-level language
A *programming language* that resembles an ordinary spoken language (e.g., English). *BASIC* is a high-level language.

Information services
Broad-based *data bases* that offer a variety of services, ranging from airline reservation information to stock market quotations. You need a *modem* to link up with such a service.

Input
Programs or *data* entered into the computer.

Interface
An electronic connector between the computer and its *peripherals*.

K
Abbreviation for kilo, or 1,000. When used to describe the amount of *memory*, or storage space, a computer has, it often signifies 1,024. A computer with 16K *bytes* of *memory*, for example, can store 16,384 *characters* of information.

Keyboard
Designed much like that of a standard typewriter, the keyboard is used to enter information into the computer.

Load
To enter a *program* from an external storage device into the computer.

LOGO
A *programming language* that allows the user to draw pictures on the screen. LOGO is particularly good for teaching young children how to *program*.

Loop
A statement in a *program* that instructs the computer to repeat a certain task.

Machine language
A binary code consisting of "0"s and "1"s, which is the only language a computer understands. *Programs* written in any other language, such as *BASIC*, are translated into machine language for processing.

Membrane
A type of computer *keyboard* with a flat, smooth surface.

Memory
The place in a computer where *data* and *programs* are stored.

Menu
A list on a *CRT* of the operational options of a computer *program*; a list of programs stored on a tape or *disk*.

Microcomputer
A small computer designed primarily for home or small business use. The micro can do today what many room-sized mainframe computers did 20 years ago.

Microprocessor
A tiny processor on a single *chip*. The "brains" of all *microcomputers*, it is also found in many consumer and industrial products.

Modem
A contraction of Modulator/Demodulator. A device that makes it possible to transmit and receive computer *data* over telephone lines.

Monitor
A device for visually displaying a computer *program* or the results of that program on a screen. See *CRT*.

Network
A system of linking computers so that users can share resources and exchange information.

Operating system
A *program* that controls the operation of a computer system, such as controlling signals to the *disk drive* or *printer*. When a computer system is turned on, the operating system is the first program executed. All subsequent programs are loaded and supervised by the operating system.

Output
Computer-generated information that is transferred to a *monitor*, *disk*, tape, or *printer*.

PASCAL
A *programming language* that can be used on many *microcomputers*. While it is considered more difficult to learn than *BASIC*, it can generate *programs* that run faster and use less *memory*.

Peripherals
Hardware accessories for a computer, such as a *disk drive*, *printer*, or *modem*.

Pixel
Stands for "picture element." A single dot of light on a TV screen or computer monitor. These tiny elements are used to create electronic pictures, or *graphics*.

Plotter
A machine, attached to a computer, that prints lines or graphs on paper.

Printer
A machine that transfers information stored in the computer onto paper. Two of the most commonly used printers are: dot matrix—a printer that forms *text* or *graphics* using a group of individual points (dots); and letter quality—a printer that prints fully formed characters (like a typewriter), using a type element called a "daisy wheel."

Program
A set of step-by-step instructions that tells a computer how to solve a given problem. Also, to prepare such a set of instructions.

Programming language
A language, with clearly defined rules, that can be used to express a computer *program*.

RAM
Random Access Memory. An area in the computer where information is stored. When called into this area, information can be *read*, changed, or edited. However, it will be lost when the computer's power is turned off, unless you first *save* the information.

Read
The process of copying information from a storage device (such as floppy *disk* or tape) into the computer's *memory*. Reading only copies; it does not erase the *data* from where it is stored.

Resolution
The sharpness of a picture on a *CRT*, usually described as "high" or "low." The higher the resolution, the sharper the picture. Resolution is expressed by the number of *pixels* in the display. For example, 560x720 is much sharper than 275x400.

ROM
Read Only Memory. Permanent *memory* built into a computer by a manufacturer. The information stored here gives the computer operating instructions when it is first turned on. The user cannot change this memory, but "only read" it.

Save
To store information from *memory* on tape or *disk* so that it can be used again.

Software
Computer *programs*. Also, tapes and *disks*.

Stringy floppy
A computer storage device that holds a magnetic tape, called a wafer. The enclosed wafer tape is thinner, narrower, and faster than conventional cassette tapes.

Terminal
A computer user's workstation. Also refers to the computer screen where information is displayed.

Text
Words, letters, and numbers that appear on a *CRT*. Contrasted with *graphics*, which are lines, shapes, and symbols.

Winchester
A type of hard disk that is sealed in an air-tight, dust-free container. See *disk*.

Word processor
A *program* that allows the user to write, edit, or rewrite *text*. The *text* can be saved on a storage device and printed out. A word processor allows the user to make changes in the same *text* without retyping the whole page.

Write
The opposite of *read*. To transfer information from the computer's *memory* to a storage device such as a floppy *disk*. Write-protect is a procedure for preventing a disk from being written to.

THE PRIMER
THE SETTING

It takes care to shop for a computer. It takes still more care to set it up properly. Reading the directions thoroughly is important. So is common sense. Today's personal computers may be sturdy machines, designed for many hours of use, but they can also be sensitive and finicky. Here are six steps to get you off and running.

1. Setting Up

When you open the box, check the manufacturer's packing list (or manual) to make sure you have all the parts. If you don't, call the store immediately.

Set the computer in an area that won't get a lot of traffic. And keep in mind that the computer will function best at normal room temperature. In unusually cool or damp rooms, such as an unheated basement, the computer will need some time to warm up.

Keep the surface around the computer clear, so the machine can get good air circulation when working. Even those machines that have interior fans need air movement to keep from overheating.

As with a TV, position the monitor away from sunlight glare, which can cause eyestrain. And, if you have a printer, try to place it on a separate table, so that its vibrations don't jiggle the computer.

2. Beware of Static

If the computer room has a rug, beware of static electricity. Small doses of static can cause the computer to speak gibberish; large doses may cause real damage. Static electricity is most likely to build up in winter months, when rooms are hot and dry, but it's easy to combat—just spray the rug with a mild mixture of fabric softener (such as Downy or Stay-Puf) and water. If the static recurs frequently, you may need a humidifier or static mat.

3. Plugging In

Buy a power strip, available from most hardware stores for around $20, to eliminate the massive tangle of cords and wires from your computer, video monitor, disk drive or tape deck, and other peripherals. You don't want small children or pets to bring the whole system crashing to the floor. And don't plug heavy appliances into the same outlet as the computer. When turned on they will cause a sudden drop in voltage, which may play havoc with the computer.

4. No Food or Drinks Allowed

Do not eat or drink near the computer and its accessories. Foreign substances, including spills, dust, and smoke, can destroy programs on cassettes and disks—and they will slowly wear down the computer, cassette player, or disk drive.

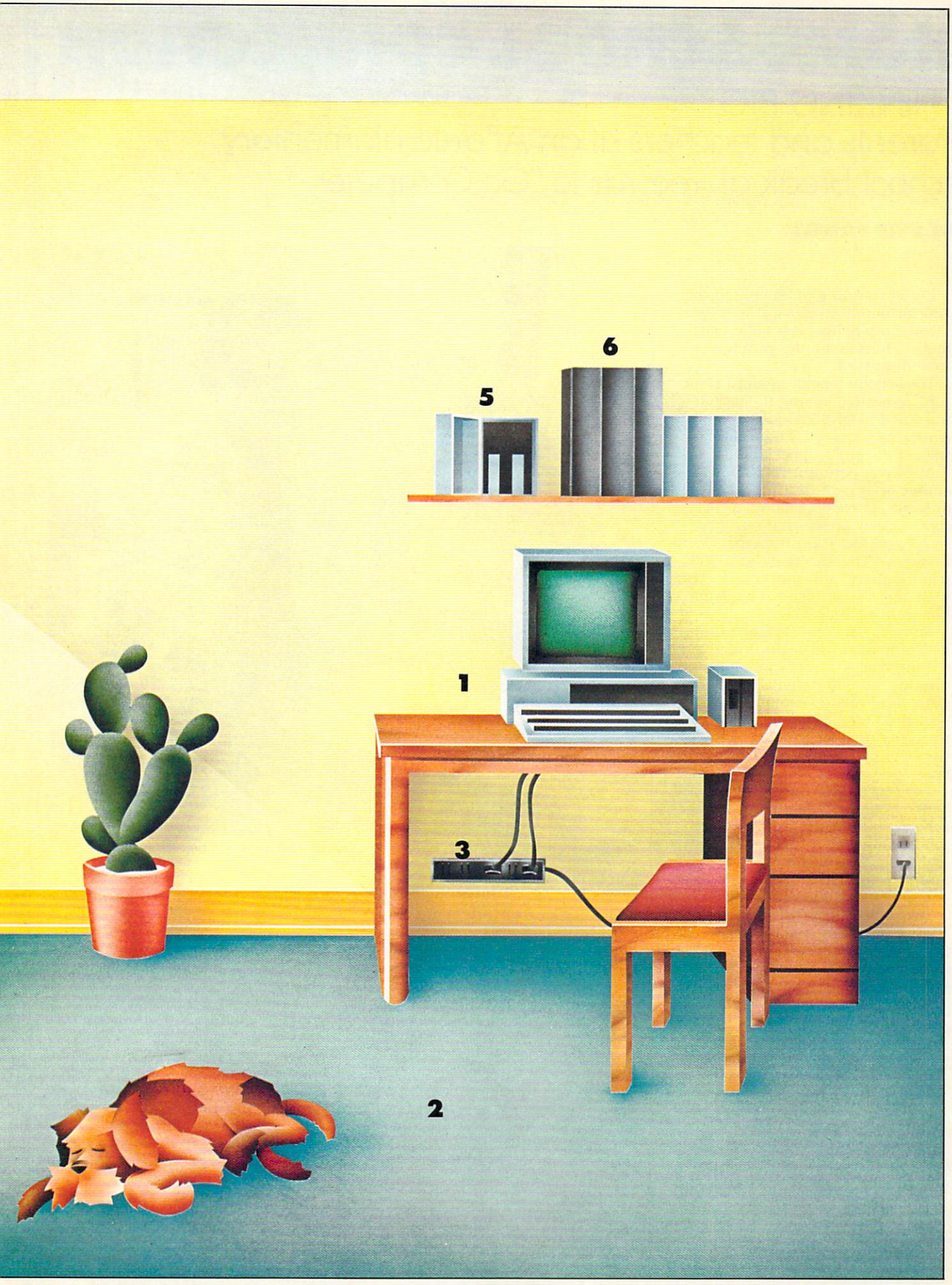
5. Safekeeping

To protect programs, keep all cassettes, cartridges, or disks in tightly closed boxes out of reach of small children and pets. The boxes should not be near magnets or magnetized tools, which may erase programs. Disks are especially sensitive (more so than records), and can be ruined by a thumb print. Treat them gingerly, as if they had a "Wet Paint" sign on them. Valuable programs should be copied and stored elsewhere, as a form of insurance. The owner's manual will explain the copying process.

6. Read Before You Leap

Before using the computer, read the manual carefully. Even though you can't do the computer much harm by experimenting with the keyboard, you will save some initial frustration by memorizing basic instructions. It may pay to copy these instructions and tape them on the wall in front of you. In any event, keep the manual nearby, preferably on a shelf with your programs.

Don't worry about the whirring or clicking sounds the computer makes when storing or retrieving data. These are, after all, just the sounds of a machine with a giant memory at work. FC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HOME-SCHOOL CONNECTION

THINKING BIG

Parents and teachers at an Atlanta elementary school break all records to "Go Computer."

BY BETH POWELL

It was standing room only in the auditorium of Atlanta's E.W. Oliver Elementary School last fall on the night school computer purchases were discussed.

The school, a bold, modern structure, is nestled among the well-kept, tree-lined neighborhoods just south of Atlanta's airport, which have attracted the city's upper middle class.

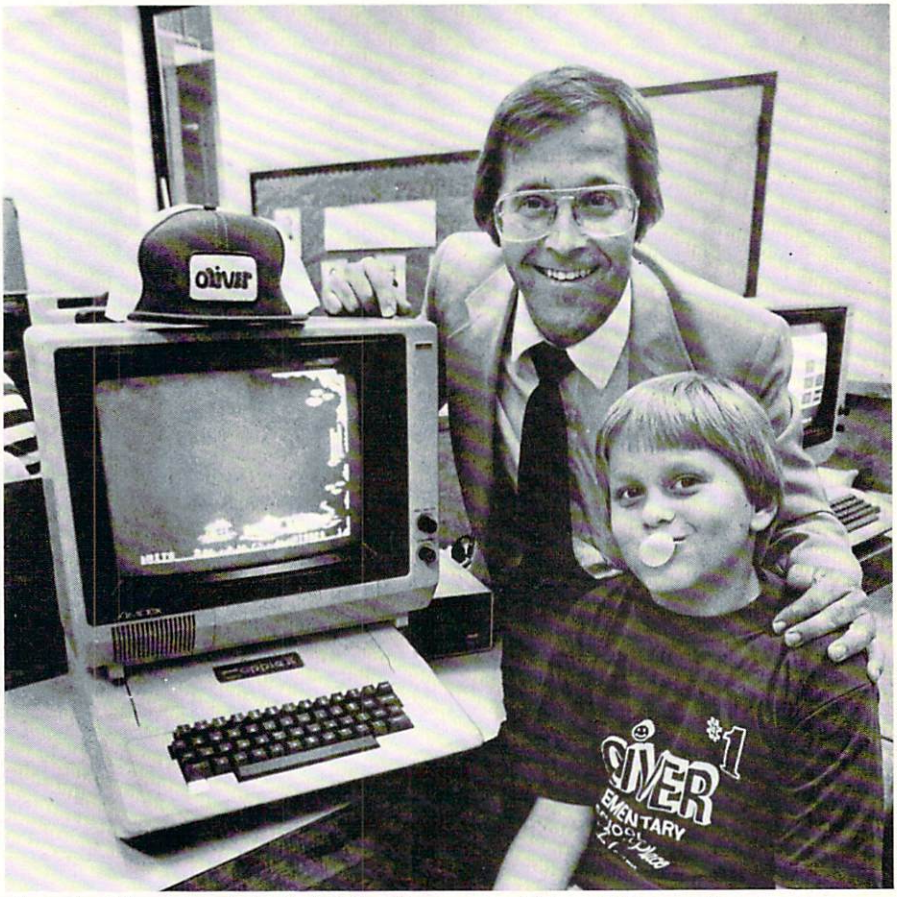
At Oliver, parent involvement has always been high, but this event was different. Parents responded "as soon as they knew what our goal was," said Assistant Principal David Knowles. "There were at least 500 parents there, and this is in a school with only 660 students," he said. "We were all amazed."

Knowles was soon to learn that he'd only seen the beginning of parent interest. At that September meeting, all 500 parents voted to begin a fund-raising campaign with a goal of $3,000. That would allow them to purchase the four Apples the school had been renting for a year.

The Clayton County School Board, which oversees Oliver and 39 other schools in its district, had begun purchasing computers, but junior and senior high schools were given first priority. That just wasn't good enough for the parents at Oliver.

"We're hearing it from everywhere that our children will be behind by the time they graduate if they don't learn about computers," said Cathy Gebhardt, PTA budget and finance director and mother of fifth-grader Andrew. Her concerns were echoed by a number of Oliver parents, all of them determined that every child in the school would have the opportunity to learn to operate a computer—not just occasionally, but on a weekly hands-on basis.

So one month after their meeting, 450 parents set out to sell sausage and cheese products through a marketing firm that had decided to test Oliver as its first school client. It was an experiment that paid off quickly. In one week Oliver boosters had turned in $35,000 and made a profit of $15,500 expressly for school computers, more than five times their goal.



PHOTOGRAPHS BY ALAN WIENER

The apple of his eye: Dennis Woods visits the Oliver computer lab to watch his son Jeffrey at work.

"Nobody—as far as we know in Clayton County—had ever seen sales over $10,000 for campaigns like this," Knowles said. "Everybody was in awe." The fund-raising campaign was so successful that Oliver parents and teachers were voted the top PTA in Georgia for the 1982-83 school year. But the result that really matters to them is that Oliver now has 12 Apples.

Although other schools in the Clayton County district are using computers, most of the elementary schools of similar size to Oliver average only two or three computers for the entire school. And the programs offer students only a few minutes at a time at the keyboard. Many of the junior highs offer computer training only as an elective or as a special math course.

At Oliver now, all students are guaranteed at least 45 minutes each week on the Apples. In addition, gifted and disability classes each get an extra 45 minutes a week. Even so, Danette Summa, a fifth grader, says she's "always glad" when her mother comes late in the afternoon to pick her up after school. That way, she explains, she can spend more time "getting to my programs."

Oliver has joined the Minnesota Educational Computing Consortium (MECC), a service that offers a series of hundreds of grade- and subject-

continued on page 26

BETH POWELL *is a freelance writer living in Jacksonville, Florida. She is a regular contributor to* Jacksonville Monthly *magazine.*

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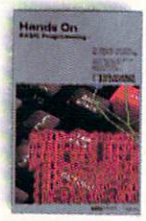
Introduction to Poetry presents rhyme and meter in a clear and simple tutorial format. Definitions are given on the screen and are sounded out by your computer. The program is highly interactive and easy to operate. *Apple $39.95.*

Computer Skills



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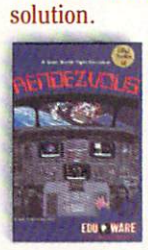

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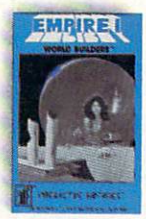

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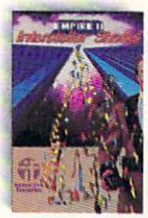

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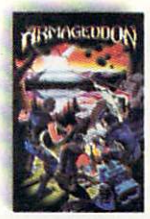

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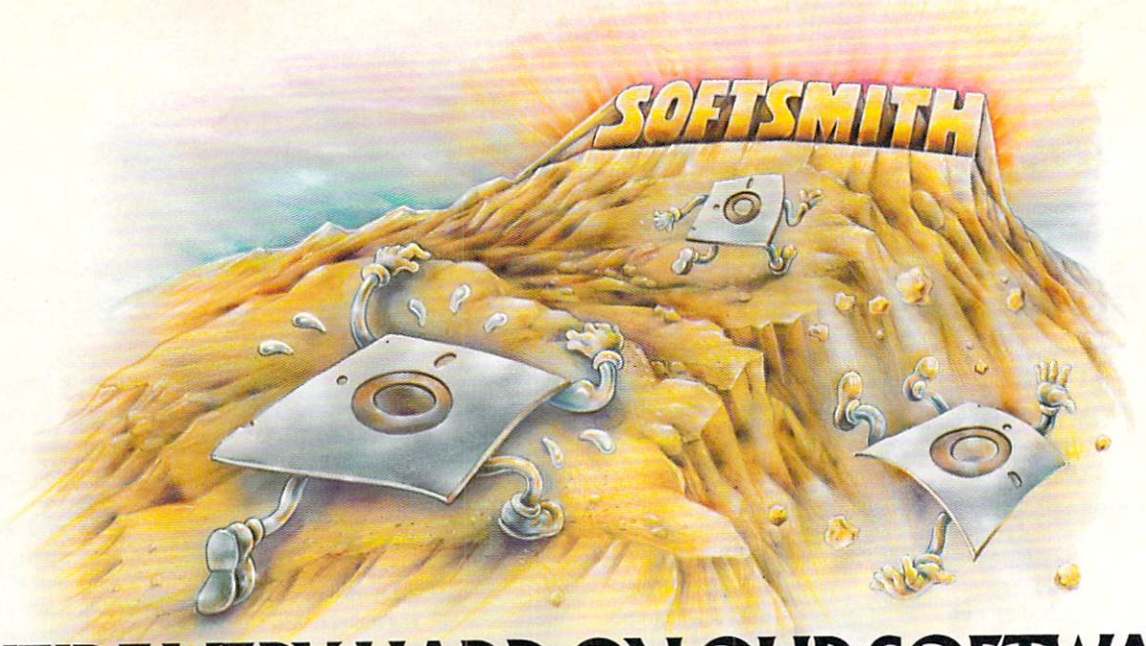

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HOME-SCHOOL CONNECTION

continued from page 22

specific programs. Teachers can order those programs tailored to supplement their specific curriculum. Oliver kindergarten teachers, for example, use a MECC concentration game, which teaches shape and color recognition. Sixth-grade teachers use a MECC program that instructs their students to chart the circulation flow of fish. Each student at Oliver begins learning keyboard skills in kindergarten and simple programming in BASIC by the second grade.

Even though the computer lab, housed in an extra classroom (with three formica-top wooden tables, custom-built by an Oliver father) is the largest school facility in the county, it's always filled to capacity. Knowles has painstakingly sandwiched seven computer classes into the six-hour school day, and has had to stick to a grade-by-grade schedule before and after school hours to keep the lab from being mobbed by enthusiastic students. "We have kids waiting for us in the morning and we run them out in the afternoon," he said, "And I still get calls constantly from parents worried that their children aren't getting enough computer time.

In an effort to guarantee their children more computer time, enthusiastic parents have geared up for a new fund-raising campaign this fall. Knowles is so encouraged that he's started plans to buy four more Apples to give students private extracurricular computer time in a small room off the school library; three additional Apples for the main lab; and a networking system that will allow all school computers to be connected to one central disk.

"We're going to sell $50,000 this time," says Cathy Gebhardt with a determined glint in her brown eyes.

> "PEOPLE REALLY RESPONDED WHEN WE TOLD THEM WE WERE RAISING MONEY TO HELP PAY FOR COMPUTERS FOR OUR KIDS."

"Everybody's involved now. It's such a joint effort that none of us feel we have to work that hard," said Donna Shaw, mother of two Oliver students. Donna and her husband Jon raised $350 for last year's campaign. "The fact that we were raising money to help pay for computers for our kids really helped, too," she said. "People really responded when we told them what we were doing."

And what Oliver parents were doing was much more than raising money. In fact, computer purchasing has been just the beginning of parent involvement with computer studies at the school. The slogan for last year's sales campaign asked parents not only to participate in fund raising, but also to "tune into computer learning."

One hundred parents did just that, enrolling in afternoon and evening classes run by Oliver teachers, who quickly realized that they were working with a group of willing and dedicated computer initiates.

"The response was overwhelming," said Phyllis Huff, teacher of gifted students and one of the workshop instructors. "I was planning on running two or three workshops, but we ended up with eight or nine." Huff and the other teachers at Oliver had been trained by a school district staff-development instructor.

The parents who came to workshops each paid $3 for a two-and-a-half-hour computer-awareness workshop, and the teachers were paid extra for their time. Huff expects another large group of eager faces this year, so she and another teacher of gifted students are preparing to teach a new set of classes this fall.

"I wanted to know what Andrew was talking about now that he was getting on his new computer at school," says workshop graduate Cathy Gebhardt. "My husband is a mechanic with Delta Airlines and they're ordering parts by computer now, so I was the only one in the family who didn't know about them."

There has been so much parent interest in the computer-learning process that the school has considered having the parents themselves teach the computer labs. "It's common to see parents in the computer room learning with their kids in the afternoon," said Knowles. "We have parents schedule their day so they can actually come to computer class with their children."

"If it's that important to our children," Debbie Krivacek said, "we parents want to be in on it, too." Raising money and coming to school to share class time with their children was only the first step for some Oliver families. Pauline Galloway, a former high school math teacher and IRS employee who uses mainframe computers on the job, says her family got so involved in computers that they went out and bought an Atari 400 for home use. But Mrs. Galloway sighed as she acknowledged that she, her husband, and 12-year-old daughter Kathryn "get to use the computer only when Gregory [age 17] lets us."

There were a number of students who ached for even more time with the computers at Oliver, so last summer the school offered six consecutive weeks of computer "camps," the

continued on page 29

Don't say cheese, say computerese! Alicia Yates and David Knowles take a break with her second graders.

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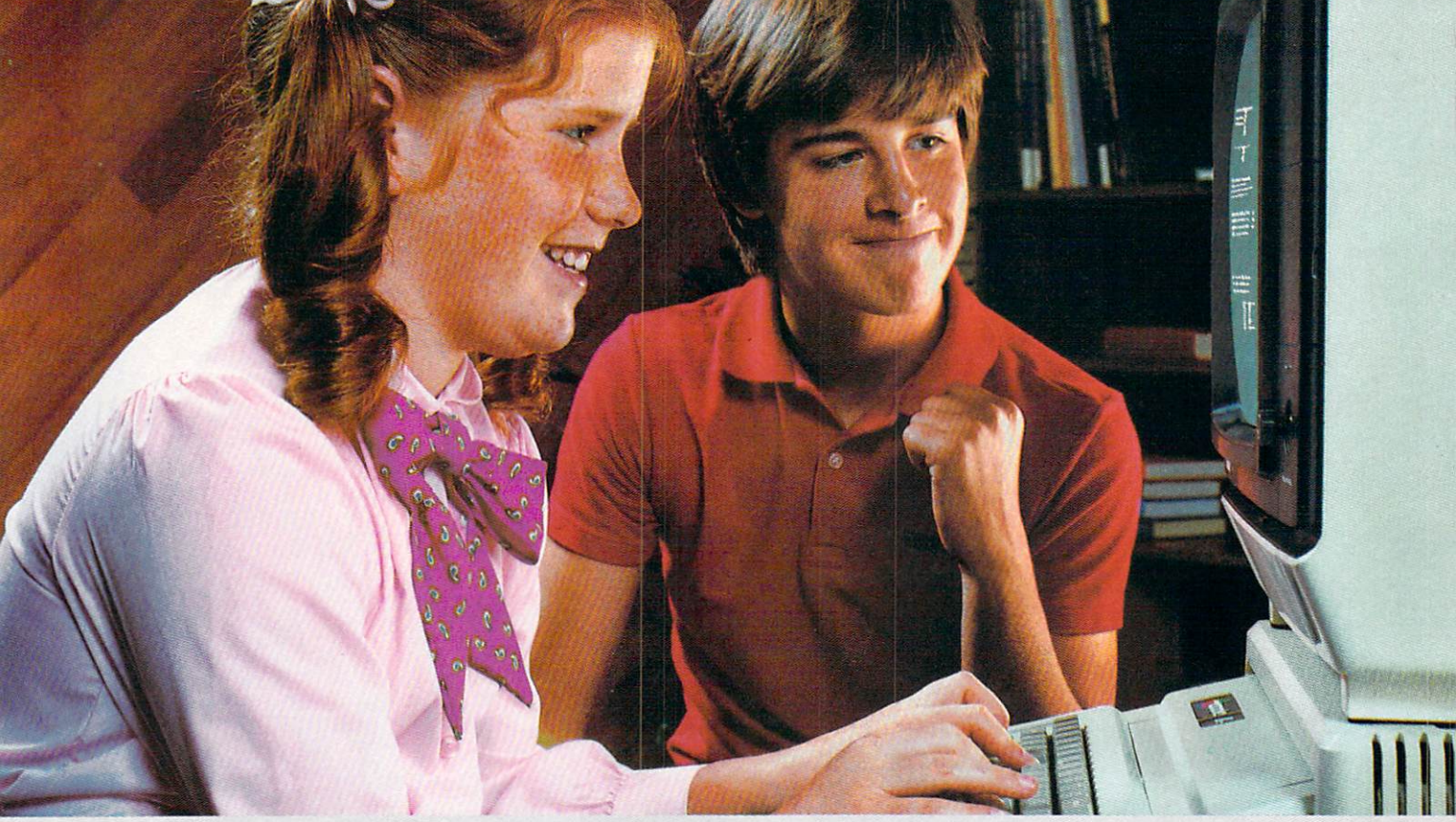

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HOME SCHOOL CONNECTION

continued from page 26
school's first summer program. It was set up so that the school could share its computer wealth with the entire Clayton County community, since students, from second grade through high school, were eligible to attend.

Students, who each had access to their own computer during camp, could sign up for one week of either morning or afternoon classes. The $50 fee helped pay for teacher salaries and the extra electricity required to air-condition and power the computer lab.

The camp sessions weren't an unexpected payoff of the fund-raising campaign. According to PTA President Rose Denzin, Oliver families were looking to the larger benefits that would come from their efforts, such as the camp, from the start.

As she took office early last year, Mrs. Denzin told PTA members that in financing its computer program, Oliver's goal would be to "set up a futuristic type of education" in which "the whole family can get involved. . . . Not only that but our community can receive benefits this year as well as eons to come."

That's a mighty big goal, but it's apparent from the enthusiasm of the parents and teachers of E.W. Oliver school that they believe they're well on their way.

"I would tell every school, whatever you do, go out and get started with a computer program," Knowles said. "But get your parents involved. They go out and sell for the Little League and for the Girl Scouts. Why not a fund raiser to help your child learn for the future?"

THE STEPS TO SUCCESS

BY JAMES L. FORNEY

Many parents of elementary school children who recognize the need for both computer literacy and budget cuts are taking a leadership role in providing access to computers in their schools. The following information is intended to guide concerned parents and teachers.

ORGANIZATION

1. Gain Principal's Support. If the principal is not enthusiastic, you should gather data and success stories from other schools while the principal's commitment strengthens.

2. Organize or Mobilize Sponsoring Group. This group may be an existing one such as the PTA, or it may be necessary to form a computer club. Community involvement must be apparent.

3. Form a Steering Committee (SC). The sponsoring group should appoint a steering committee of five to eight members who have either a personal or a professional background in computers.

4. Define the Overall Plan. The first task of the SC is to lay out a plan covering several years.

5. Determine Feasibility of the Plan. Depending on available funds, the sponsoring group may decide that the plan needs to be scaled back, lengthened, or killed.

RESEARCH

1. Develop Curriculum Guidelines. If the school or the district has not already devised such guidelines, or if what exists appears inadequate, consult the local teaching staff about the school's needs.

2. Initiate Fund Raising. There are a variety of ways to accomplish fund raising. (See main article for a description of one successful venture.) Contact local computer vendors or major users of electronic data processing for donations of money or equipment. Foundations should be sought for possible grants.

3. Communicate with the School Community. This can be accomplished through a column in the school newspaper, PTA bulletin, or a letter from the principal.

4. Begin Equipment Research and Evaluation. Specifications for both the equipment and the vendor must be set. For example, the committee may agree that the equipment should have color graphics capability, capability for hard disk, and multiuser capability; that it should have been field-proven in a similar school for at least six months; that there should be at least "X" other users in the local area; and that repair facilities should be available in the community. Ease of use and sturdiness are important, as is dependability of computer hardware.

The SC should examine the software that is available for each of the various computer systems. [Editor's note: *Many experts say you should select software and then buy the corresponding system.*]

IMPLEMENTATION

1. Request Bids. The proposal should be sent to at least three sources, including local companies, if possible.

2. Assign Responsibilities and Deadlines. Now the other tasks that must be accomplished need to be identified, listed, and explained to the principal and staff.

Examples of these tasks are: developing goals and principles regarding the curriculum and the use of computers in the school; determining the location of the computers; defining the security measures necessary; identifying the personnel resources needed to introduce the computer curriculum; locating other schools using the same or similar equipment; and establishing a liaison to exchange solutions.

3. Form a School Computer Committee (SCC). The SCC, a group of no more than six, must consist primarily of teachers, since its purpose is to establish curriculum and procedures.

4. Monitor Progress. The SCC should review the progress on a regular basis.

5. Revise the Plan at the Beginning of the Next School Year. The first year of the implementation of a computer program may cause a great deal of disruption in the school. Care should be exercised continually to ensure that the plan remains achievable and is not just a case of "pie in the sky."

JAMES FORNEY *was a member of the steering committee that helped plan the implementation of computers into the curriculum at Ainsworth Elementary School in Portland, Oregon.*

This information was adapted from an article in the December 1982/January 1983 issue of PTA Today. *For a copy of that issue, which focused on "What parents should know about computers," send $1 to* PTA Today, *700 N. Rush St., Chicago IL 60611.*

HOME BUSINESS

FROM DIAPERS TO DISK DRIVES

One mother finds that running her own business doesn't mean leaving home.

BY JON ZONDERMAN

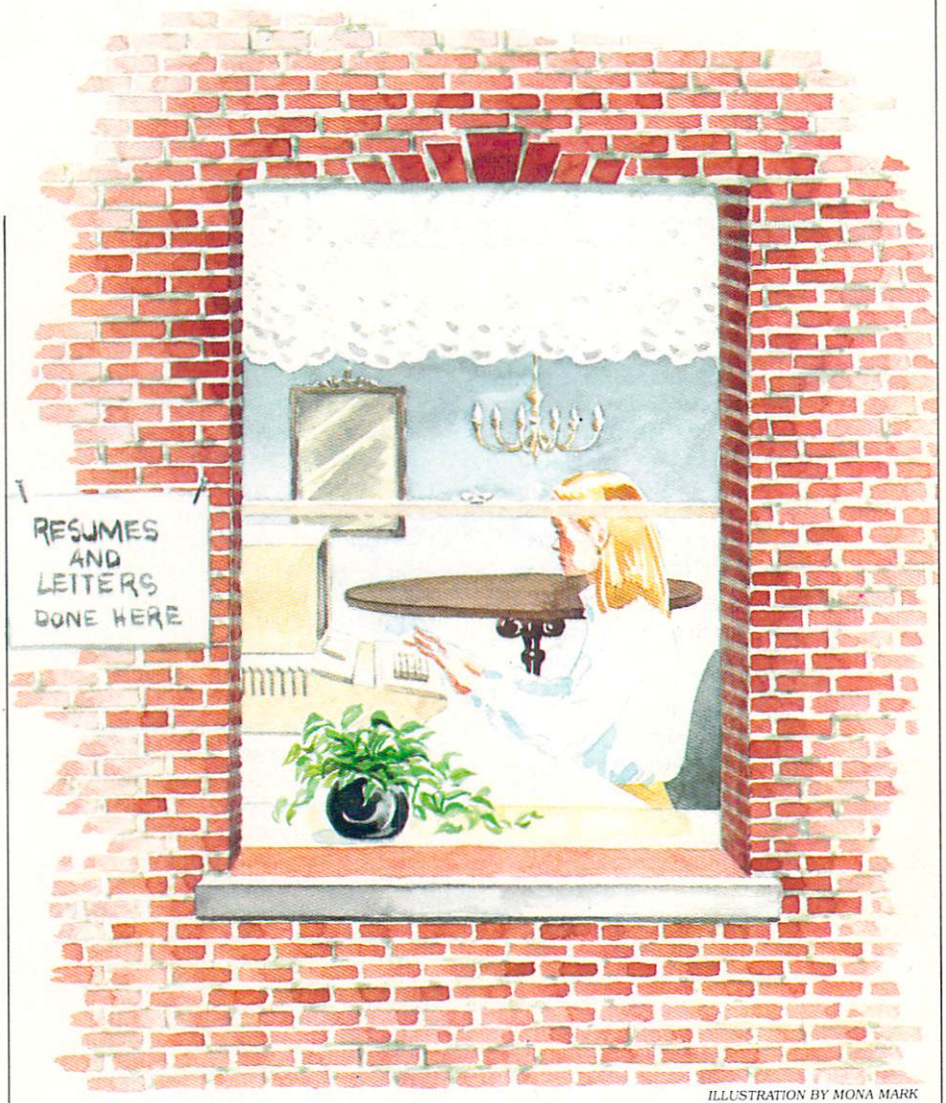

ILLUSTRATION BY MONA MARK

It is September, and Karen Blackburn has begun her yearly advertising campaign, putting up signs at the Boston University School of Law. Her business, writing resumes and cover letters for B.U. law students seeking both summer and full-time employment, has been booming for these last two years.

The computer power she commands with a Commodore 80-32 computer allows her to compete efficiently against large word-processing firms that include this work as part of a full-service business. But Karen, a one-person shop, has decided to specialize in this type of word processing. She works out of her home with a low overhead and has special knowledge of the difficult process of finding a job after law school (her husband graduated B.U. Law this past spring). So Karen can offer a number of advantages; she is willing to do her job with a personal touch—writing an extra letter, a special one, to the firm where someone has a connection; dashing off a quick thank-you letter to a firm that has just offered a candidate an interview; and even helping students create a stategy for finding a job.

The business is perfect for the mother of two young boys—Christopher, age eight, and Winston, who likes to be called Wink, age five. She is busy for about six months a year, during the peak seasons for job hunting. Her kids' vacations coincide with her customers', so there is little conflict between the mother and the businesswoman.

This past summer, Karen spent a working vacation at Cape Cod, putting her lists of law firms onto her new data-base-management program for easier access this coming year and updating all of her lists, which she does annually. But because her husband Gregg bought a second 80-32, which spent the summer in their Cape Cod home, and her data-base work didn't require a printer, she left her entire system at home in Brookline, Massachusetts.

Brookline, one of the streetcar suburbs of Boston, is a 20-minute walk from the law school. The Blackburns own a spacious three-bedroom condominium in an old brick building on a tree-lined road. (Residents fondly call it "Sesame Street.") The computer sits in a room that once served as maid's quarters, which the Blackburn family has redesigned as an office. Both Karen and Gregg shared the room at first, but Gregg found it too small and too noisy to work in. He moved the family's second Commodore to the master bedroom so he could continue to take notes from his law school readings, and write briefs and assignments.

At 36, Karen Blackburn has been working sporadically for 13 years. Her word-processing business began

continued on page 32

JON ZONDERMAN *is a contributing editor to* Computer Update, *the magazine of the Boston Computer Society. His work has also appeared in* The New York Times, Science Digest, *and* The Boston Business Journal.

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continued from page 30
around January, 1981, a few months after she and her family had moved from Vermont to Boston for her husband to attend law school. Prior to that he had been a reporter and city editor for the *Times-Argus*, a small daily newspaper in Barre, Vermont. Karen was no stranger to running a home business, having organized a brown-bag lunch concession for her husband's newspaper colleagues as well as a second venture, baking bread.

"SHE BELIEVES THERE WILL ALWAYS BE SOME PEOPLE WHO WANT THE CUSTOMIZED WORK ONLY A SMALL SHOP WILL DO."

Gregg Blackburn had used word-processing equipment at the newspaper for a number of years and was loath to go back to the typewriter when he entered law school. When the kids began school and Karen had more free time, she decided she wanted to start another home business—preferably one in which she could use a computer. That way she and Gregg could buy a system and get a tax advantage on it for her business use.

"I first used it to type some term papers," Karen remembers. "Then I did some resumes and cover letters. I even took a course in resume writing." By the time Gregg began to look for summer work, Karen had decided to make writing resumes and cover letters into a business.

"Some people write 300 letters for jobs," she says of the tight job market recently graduated lawyers encounter. She developed a master list of law firms in New York, Boston, and some of the other major cities in which B.U. graduates were likely to seek work. She put the list onto disks, using her word-processing software, *WordPro 4 plus*.

When a customer didn't want to apply to all the firms she had listed for a particular city, she made a copy of the master list, deleted the firms to which the customer didn't want to apply, and sent letters to all the others. As she picked up more information about different firms—which partner was responsible for hiring, what kind of lawyers they were looking for at any particular time—she began taking a more active role in choosing which firms to apply to, consulting customers on matching their goals with what was available and with who was looking for whom.

Many times this involves writing two, three, or maybe more different form letters, and matching each letter to a select group of firms. Most word-processing firms charge a one-time "setup" fee for creating each form letter, then an additional charge for each letter printed. Although some undercut Karen's 75 cents per letter basic price, she does all the setup necessary for free as a loss leader. She also writes the resume and throws in the intelligence gathering and consulting at no charge. She figures she earns about $10 an hour for about 20 full weeks during the year.

Clearly, Karen is not in the business solely as a money-making venture. "If I can make enough to pay my business expenses, go on a nice vacation, and still maintain the family, I feel I've contributed a lot," she explains. "I'm just glad I don't have to support us on this."

She is not worried by the rumors that some people are coming to Boston to take over the cover-letter business at all six area law schools. She believes there will always be some people who want the customized work only a small shop will do. And there are other businesses she could start with the computer, such as mail-order advertising, fund raising, and organizing people's files for them.

Of course, the drawback in her $5,000 system, which includes a $2,800 NEC Spinwriter letter-quality printer with tractor drive and two standard disk drives, is that it is not exactly a computer the whole family can use. There is limited educational software available for the 80-32 at this time, although the Blackburns do have a disk with such board games as *Othello* and *Monopoly*, and another disk called *Teacher's Pet*, which has letter recognition, counting, and arithmetic drills. The Blackburns also have *Space Invaders*. But, Karen says, the kids don't use it that much and never have.

"I don't really feel that the kids have got to sit in front of a screen playing *Monopoly* or something when they could be sitting around the table with friends," Karen says. She would rather see her kids learn how to use word-processing software, data-base-management programs, and maybe try a little programming. She has volunteered to host small groups of Wink's kindergarten classmates to introduce them to computers and word processing. Slightly confused, one kindergartener called her floppy disks "disco flops."

The personal computer has added a new dimension of flexibility to working at home. Karen Blackburn says her business "may not end up being very profitable, or it may end up being killed by others getting into the business," but it has still given her the exposure to the computer and the desire to find other business uses for it. Besides, she says, "I find learning about the computer fun." And creative people can always find new ways to use the computer to have fun and turn a profit as well. FC

BEGINNING A BUSINESS

If Karen Blackburn's story has sparked your interest in starting a modest home business, here's a brief guide to what you'll require for a venture like hers. The essentials are a computer system that suits your needs (and your budget), dependable software, and endless creativity, energy, and patience.

Whether your home business focuses on direct-mail advertising, mail order sales, fund raising, cover letters, or resume writing, your hardware should include a keyboard with at least 48K memory and 80-column text display, a monitor, a letter-quality printer, and two disk drives so you can store, update, and combine files.

Any software program you select should offer word processing and the ability to create lists, or files, to sort through and merge—for example, to pull a name from a mailing list (stored on one disk) and send that person a letter the computer has stored on the second disk.

Some programs worth investigating—available for a wide variety of computers—are *ListMaker* ($97.50), *Executive Secretary* ($250), *PowerText* ($399), and *WordStar*, one of the most praised word-processing systems, with the *MailMerge* option that inserts frequently used addresses into documents ($645 for both).

—LINDA WILLIAMS

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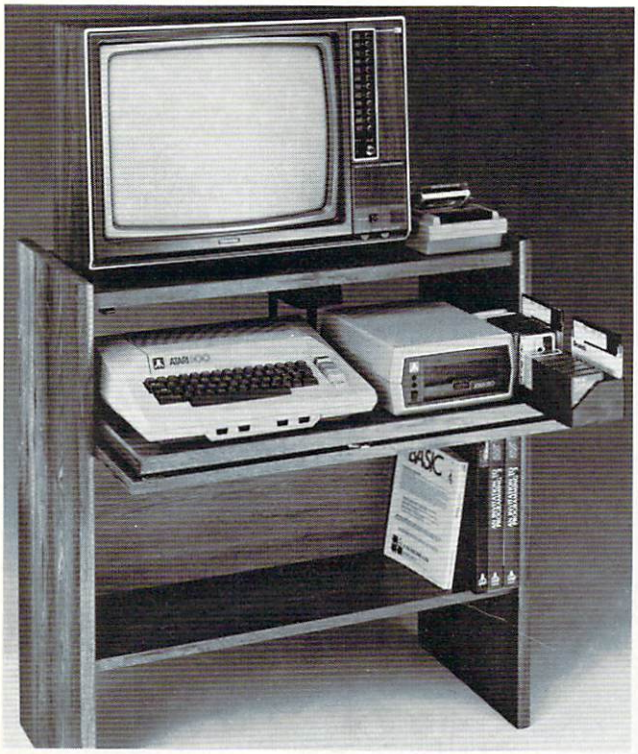

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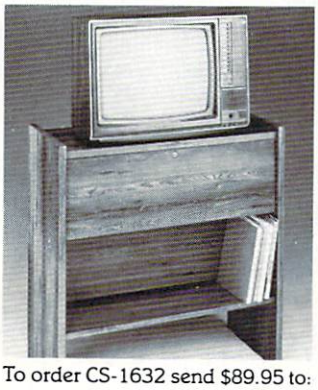

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COMPUTING CONFIDENTIAL

CONFESSIONS OF A REFORMED COMPUTER PHOBIC

BY SARAH KORTUM

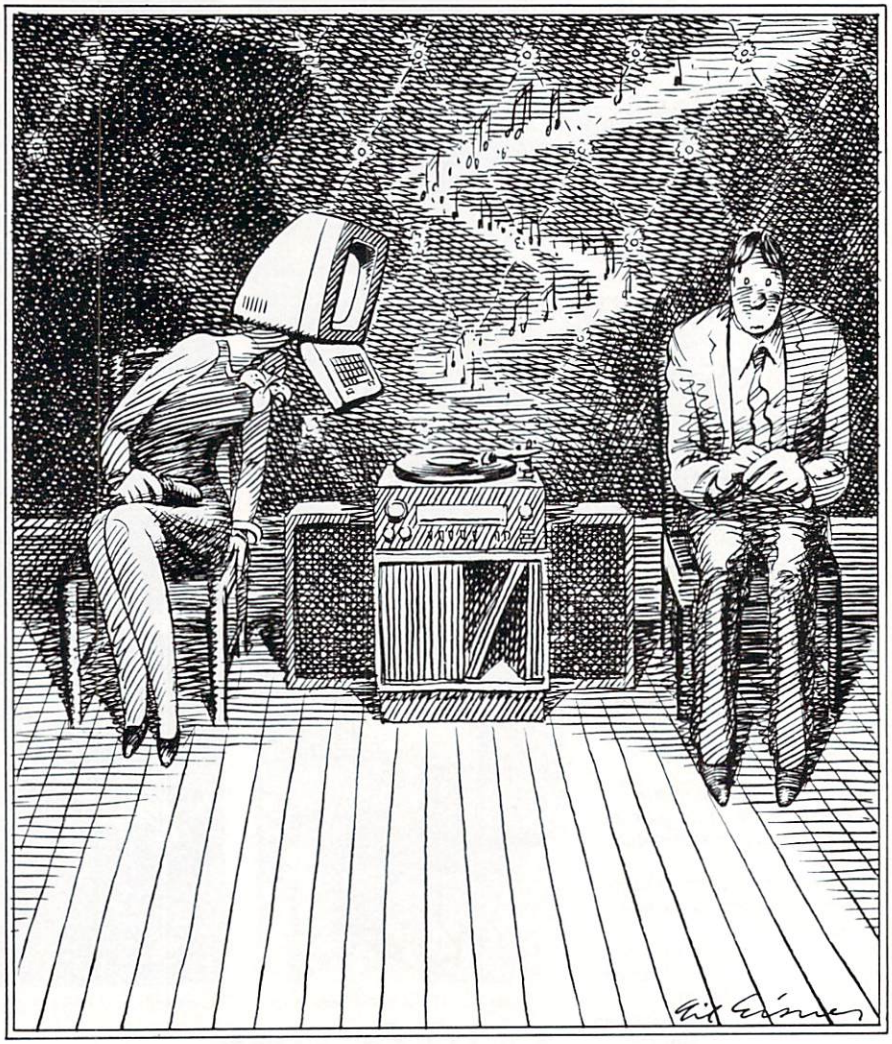

ILLUSTRATION BY GIL EISNER

Buying his first computer "felt a lot like adolescence!" recalls David Wilson. "I felt inept and always out of step. Everybody who knew more than I did was like a parent, or an authority figure."

It was five years ago on a cold February evening that David Wilson drove up to his white shingled house in Newton, Massachusetts, with his brand new Apple II in the back seat. He was 43 at the time, and the manager of a retail store. No longer in the retail business, he is now the proud owner of seven home computers, and an instructor of over a dozen computer classes at both the Cambridge and the Boston centers for adult education. But back in 1979 he was just a wallflower at the local Apple users' group meeting, where he had gone that first week to try and answer questions about his new acquisition.

"I felt isolated," recalls David, who would sit as far back as he could at the meetings. "I felt stupid. Who am I to bother these people or take their time? I'm also fairly shy. So I would just try to absorb osmotically as much as I could."

The questions he was trying to answer were about programming. "I originally bought my computer in order to experience what a computer was. The truth is that I didn't buy the computer with any specific thing in mind. So I was looking for an entry point," explains David. "I was looking for something to make the computer do that was satisfying, and that had use. At that time there wasn't much software around, and the only things the manual talked about doing was programming, so I got channeled into that."

As he listened to the general discussion at the user-group meeting, David would "pick the person who used the most words I could understand in a given sentence. And then I would try to collar that person in the corner when they broke up for subgroups. What I should have been learning about at that point was how a computer works, what the parts of it were. But I didn't even know the right questions to ask at that point. I was trying to get enough of a grasp to even be able to ask the right questions. What I really wanted was someone to tap me on the head and say, 'Hey, it's really going to be OK.' But I didn't know that that's what was going on. So I was constantly asking highly detailed, technical questions that I didn't know anything about, like 'How do you write a sort program?'

"There were one or two people who were very patient, and did take the time to try and help me. They would sit down and they would start telling me about strings and arrays, and I didn't know what a string and an array was! As soon as they started talking about strings and arrays I just went into very quiet hysteria!"

Driving the hour's ride back to his home, "I felt lost," recalls David. "It felt like coming home from parties I went to as an adolescent, where lots of folks paired off and I never did. Coming home from these meetings,

continued on page 36

SARAH KORTUM *is lifestyles editor of* FAMILY COMPUTING.

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continued from page 34
having seen people who were obviously competent and enjoying their relationships with their machines, I'd feel that I was just never going to experience that."

"AS SOON AS THEY STARTED TALKING ABOUT STRINGS AND ARRAYS I JUST WENT INTO VERY QUIET HYSTERIA!"

Back home, his frustrations continued to mount. "Oftentimes the program didn't work the way I wanted it to, and I couldn't tell whether it was something I did wrong in programming or whether it was [the fault of] the machine. I would look at my set of program steps and they made perfect sense to me!" By his second month he had developed "a growing sense of I'm just not going to be able to hack it." The computer triggered "a fear that I'm not going to be able to survive or deal or cope with the world that's being created around me. I'm going to be left behind."

Since everybody else seemed competent with the machine, David naturally concluded that "the problem was me. *I* just wasn't adequate." In retrospect, he realizes that his problems were "a combination of a lot of things: a piece of equipment that did not work as it was designed to work [David's first computer was eventually discovered to have faulty memory chips and was replaced by the store]; a matter of documentation not being very good; and a matter of the people who sold it to me not acknowledging that I was going to need to do some background work, in some systematic way, if I was going to be able to use this equipment."

And it was also a problem of expectations. "Of course my expectations of how well I should be able to do were probably also unrealistic," says David. "I had some idea of what you might be able to do with a computer, but they were very general: 'Gee, I'll be able to be in touch with the world. . . . I'll have all my books and records on file so I can just search for anything I want whenever I want to!' Without the realization that one, it was going to take a lot of time keyboarding in the information; two, I was going to need a lot more memory for that; and three, I would either have to spend a long time learning how to program or go out and spend a lot of money to get a program that would do it.

"All my myths, and most of them were myths, coupled with the fact that I couldn't even get the computer to do some very simple things that the manual said I should be able to do, made me start to lose faith in my abilities. It was a slow building of self-doubt, but it was geometric in its accumulation! I was about to discover that I was an intellectual and technical fraud. I fooled everybody for all these years, but finally I was going to be exposed to the world. It sounds silly, but when I found myself at such a loss here, it just carried over to everywhere. I questioned myself about business, and about the [personal communication] courses I was teaching [at the Cambridge Center]."

Another problem David faced was where to turn for guidance. When he passed computer stores on the street, "I wanted to go in and talk to them. I really wanted to find some place where I could get some assurance." But every time he called the store where he'd bought the machine, "they were very patronizing. It was always my fault and not the computer's fault. *I* couldn't follow instructions. And in truth, sometimes it was impossible to follow the instructions in the manual because they didn't make a whole lot of sense!

"So I started to say things to myself like, 'Well, it's obvious that I need something else in order to do what I want to do. I need this piece of equipment, I need that program.' And for a while my way of coping with all this stuff was to look for another thing that I could attach to the computer to make it all right." So he acquired a joystick. Then a modem.

"Even at home I stopped talking about the computer to my wife," says David, "because I felt the risk of really failing. She wasn't particularly interested in the computer to begin with. I had the sense she thought it was foolish to spend so much money on something that wasn't immediately useful." (His wife, Andrea, still doesn't use the computer, though their two kids, Alan, 18, and Kristin, 14, have since started to use it.) "But my wife was very tolerant. If we were at the dinner table she would ask, 'Are you going to go off to the computer?' If I said yes, and went and turned it on and it didn't work, then I'd have egg on my face! So I started to feel myself closing up on the issue. I really didn't want to talk about it."

He became increasingly superstitious. "I was almost beginning to feel that I had to sneak up on the computer, to catch it unawares, so it would work!" Soon he stopped trying. "By my fourth month my enthusiasm started to get a little tenuous." No longer did he stay up until three in the morning with the computer trying to program, as he had in the first month. Its use went from "a couple of nights every now and then" to no use at all. "My life was very full. So it was always easy not to have time to be on the computer. "And I got to the point where every

RX FOR COMPUTER PHOBIA

Do you suffer from cyberphobia (fear of computers)? Here are five suggestions to help you ease into using a computer:

1. Before you buy a computer, first ask yourself: "What do I want to do with it?" The clearer your goal is, the more likely you will achieve success.

2. Think small in the beginning days. Start with one simple use and master it. Build your experience and confidence up from that. Don't worry about all the other things that computers can do.

3. Choose something that's fun to do. Even if you feel you *should* be using a computer to plan your monthly household budget, there's no need to do that in the first week. Give yourself time to have fun with the machine and become familiar with it.

4. Don't hesitate to ask for help. But remember: Just because somebody knows a lot about computers doesn't mean that he or she is the best teacher for a beginner. Choose a guide who uses a language you understand.

5. Keep your expectations within realistic bounds. Don't expect to become a millionaire software designer overnight, or even in a year's time. Remember that day-to-day use of the computer is the most successful application.

time I saw it, it was a symbol of my incompetence. I didn't like having it around to remind me. I kept deciding that the place where I had the computer was *just right* for something else! Eventually the computer got covered up with junk mail so I wouldn't have to look at it!

"But I had talked so much to friends and associates about getting my computer, that they kept asking me about it." He was reluctant to admit "yes, I spent all that money for nothing. And there were some moments of gratification—the occasional games I enjoyed playing." And the short graphics programs he succeeded in writing. "That's why I kept going on for so many months. But in general the difficulties and the negative feedback I got from the machine outweighed the others."

Finally, in November, 10 months after he'd bought his computer, he gave up. "I just bundled it up and stuck it in the closet, saying, like

"I REALLY WANTED TO FIND SOME PLACE WHERE I COULD GET SOME ASSURANCE."

I've said with a lot of other things in my life, 'Sometime, a little later on, I'll get back to this.' It was easy to do. There was a little guilt about doing it, but there was a wonderful sense of relief!"

As he closed the closet door on his computer, he made a pact with himself. "I made it one of my goals to keep my eye out for somebody with whom I had something to exchange for help with the computer."

Three months later, he found that person in one of the personal communication classes he taught at the Cambridge Center. A student, Edwin Meyer, had a degree in computer sciences from MIT. They became friends and began to dream about opening a word-processing studio together. In April 1980, Word Works (now the Micro Workshop) opened in Cambridge, with David supplying his business expertise, and Edwin supplying his computer expertise.

"It took me a long time to learn word processing," admits David, "but I had a specific goal." Back when he first bought his computer, "I really didn't know what I wanted to do with it. I bought it because computers were an exciting idea." With a specific goal in mind, it became easier to achieve success. And with one accomplishment under his belt, "I started to have a sense I was not incompetent," explains David. So he brought his own computer out of the closet.

That fall he added a word-processing course to his class load at the Cambridge Center. "I didn't know a whole lot more about computers," explains David, "but I knew how to use the [*WordStar*] word-processing package, and that's all I was teaching."

Now he advises others: "Pick some small thing that you would like to do with the computer. Find out how to do that small thing without having to become a computer expert overnight, or even in a year's time. Don't worry about all the other things that computers can do."

David's own confidence "came over a period of time. I found that gradually, through a process more like osmosis than anything else, I became familiar with the thing. But it happened as a continuing result of small successes. And the clearer people can be about what it is they want to do with a computer, the easier it is to find ways to accomplish these small successes they're looking for. And if they do that they become more confident."

The following year, at the demand of his students, David started a second class called "Stalking the Wild Computer." More than its name was inspired by David's early experiences. Remembering those lonely nights on the outskirts of the Apple-user-group meetings, David resolved to talk about computers in a language his students would understand. "I use a lot of cooking metaphors, and analogies to people's stereo systems," he explains. But most of all, he provides that pat on the head that he now realizes he had been looking for all along.

"What I really wanted, deep down inside, was some acknowledgment that I was not an idiot or a dunce. And there were problems, but they could be overcome. So I try to assure people that they're not stupid if they can't understand." The reaction on his students' faces shows him that his own experiences were not uncommon. "I can usually see it on their faces, all of a sudden this draining of tension! It's very reassuring to them that they're not the only ones who have that fear." FC

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BY WALTER KOETKE

Should I buy the same computer for home as my child is using at school?

Not necessarily. Children usually adapt easily to using different computers. Before purchasing a computer for home use you must ask the same question educators do: "What am I going to do with the computer?" Your answer should be a major factor in the purchase decision.

Begin by making a list of what you want to do with your computer. Don't worry about possible applications two or three years from now. By then, buying a new computer to run a new application may be cheaper than buying new equipment to run that same application on an older computer. Be realistic. Don't list things you aren't likely to do just because you read about them in a magazine.

Take your list to several computer dealers. Ask them to demonstrate the software and hardware needed for each application. When you've found the combination that meets your needs, you've found the machine you ought to buy. If it's the same one your child uses in school, that's just an extra bonus—not an overriding criterion in the selection process.

How do I locate user groups in my area?

Start your search by inquiring at local computer stores. Since most user groups focus on a single brand of hardware, check with all stores that sell your brand. Don't limit your query to the store from which you purchased your equipment.

You should also check with your local high school. Ask teachers who make use of the computer about user groups, and to introduce you to students who own computers. These students are usually a rich source of knowledge.

Information services such as CompuServe and The Source also list user groups. If you don't subscribe, perhaps a demonstration at your local computer store could include a query about user groups.

Finally, the hardware manufacturers will often provide a list of larger user groups. Send a letter expressing your interest in locating or perhaps even starting such a group, and they are likely to be supportive.

My kids keep prodding me to buy new software, but the prices are astronomical. I'm thinking about buying a modem and using our Atari 800 with an information service such as CompuServe so both my children and I can get software at a reasonable price. Does this make sense?

Good idea, wrong reason. There are several valid reasons for subscribing to an information service, but just obtaining reasonably priced software is not sufficient. Not that much software is available for use, and you must pay by the minute for your use of an information service, in addition to any long-distance charges.

At present, services such as CompuServe provide personal access to large data bases of information. They also enable individuals to exchange information. A sampling of available information includes: an airline guide containing schedules and fares for all flights in North America; a shop-at-home service that gives you and your credit card access to over 60,000 consumer items; continually updated weather reports; software reviews; bibliographic information on major microcomputer magazines; a business wire service; a commodities wire service; and historical information on over 40,000 stocks, bonds, and mutual funds. And these items are only a very small sampling of the large number of data bases available.

Personal information can be exchanged via a general bulletin board, as well as through a variety of special-interest groups. CompuServe, for example, has a fairly large special-interest group of Atari users (as well as TRS, Apple, IBM, and Commodore users), which offers public-domain software. Using CompuServe's bulletin board and electronic mail system, you can contact other Atari users who might assist you on computer-related problems.

What's the law on copying disks? Almost everyone recommends making backup copies, but others say this is a form of piracy. Where is the line drawn?

Since legal interpretations of the complex copyright laws are the full-time business of many capable attorneys, please accept a personal, common-sense opinion.

If you purchased an original copy of a program, then you are entitled to a backup copy of that program. Many software producers include a backup disk in the same package as the original or provide a backup copy at little or no cost. If a reasonably priced backup copy is available from the software producer, you should certainly obtain it. If no backup copy is available, then you are entitled to make one of your own. (Note that some programs are sold on "protected" diskettes designed to make copying very difficult.)

Please be sure your backup copy is used as just that—a backup copy. Put it away. Your backup copy should be used only if and when the original disk is damaged, and then only until the original disk is replaced. You are obviously violating copyright laws if you allow others to copy your software. You are also violating copyright laws if you loan a friend your original disk while you continue to use your backup copy. FC

WALTER KOETKE *was the first to introduce computers to U.S. public schools, linking the Lexington, Massachusetts system to a mainframe in 1964. He has written for* Creative Computing *and* Microcomputing *magazines, and frequently lectures about computers to parents and educators.*

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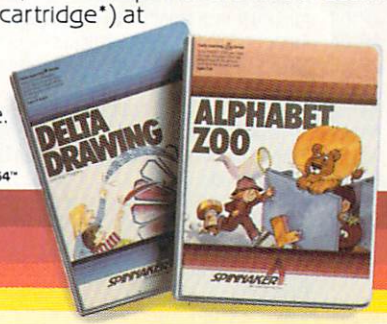

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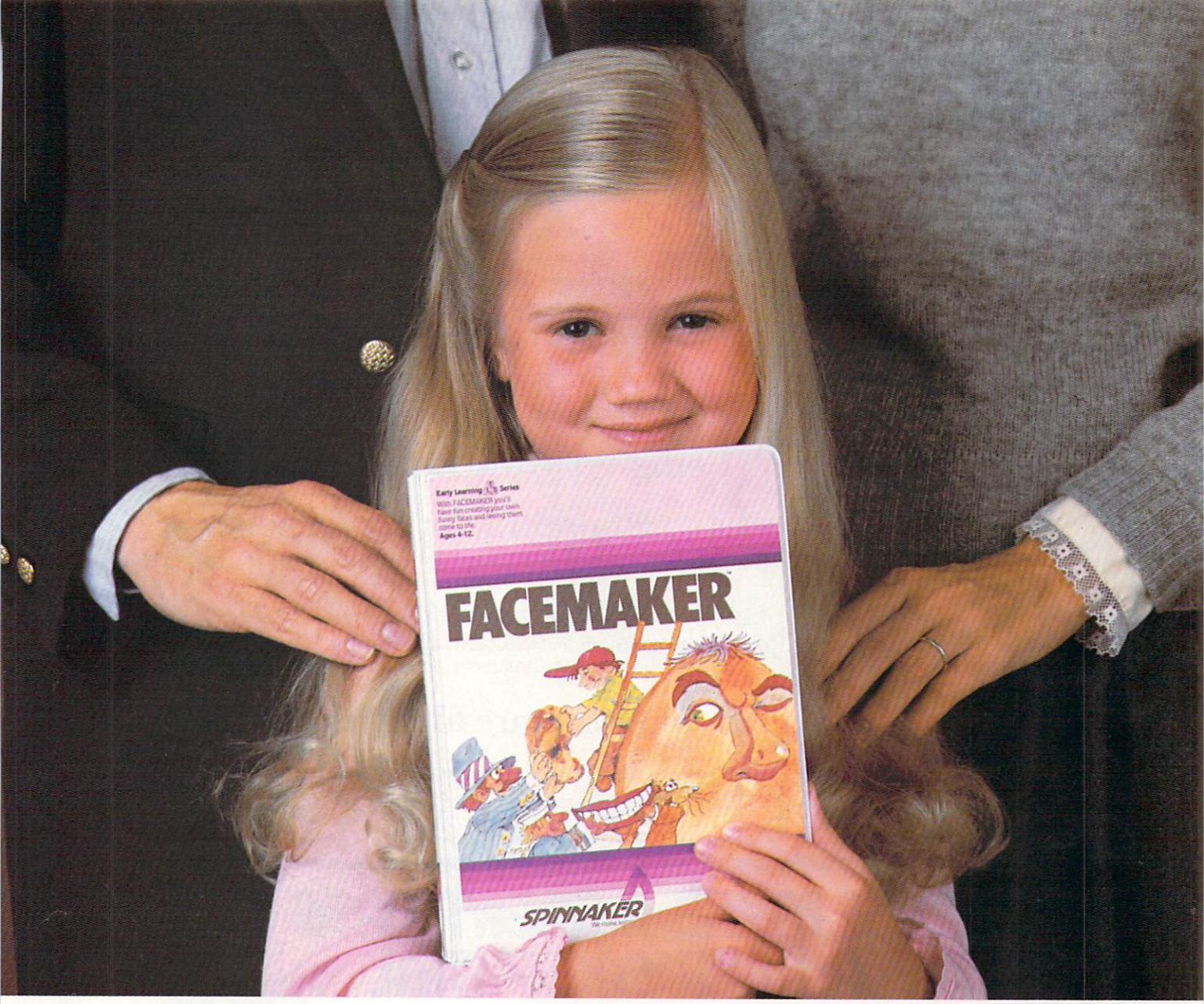

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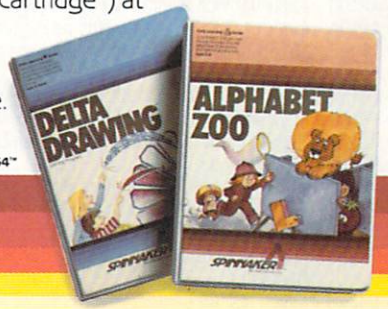

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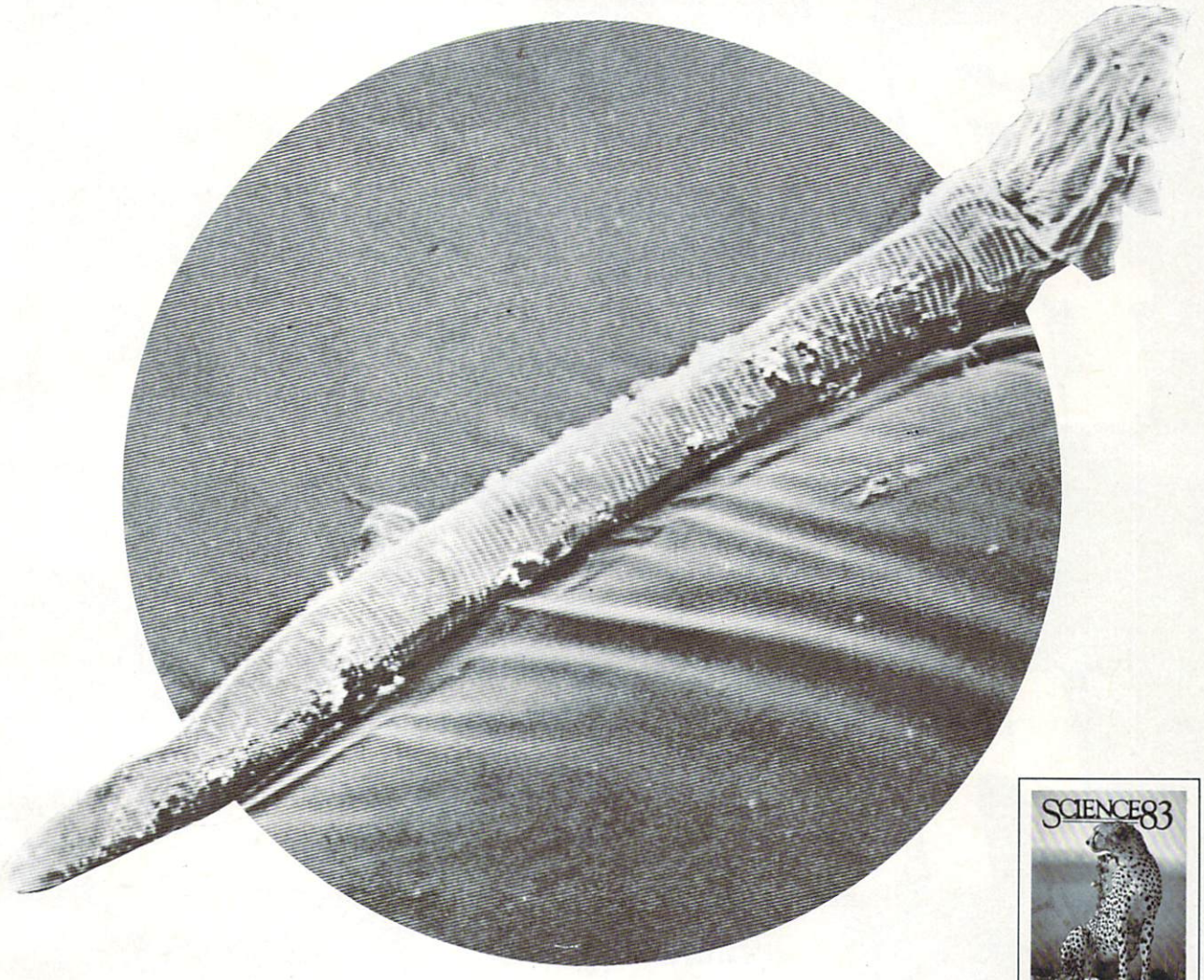

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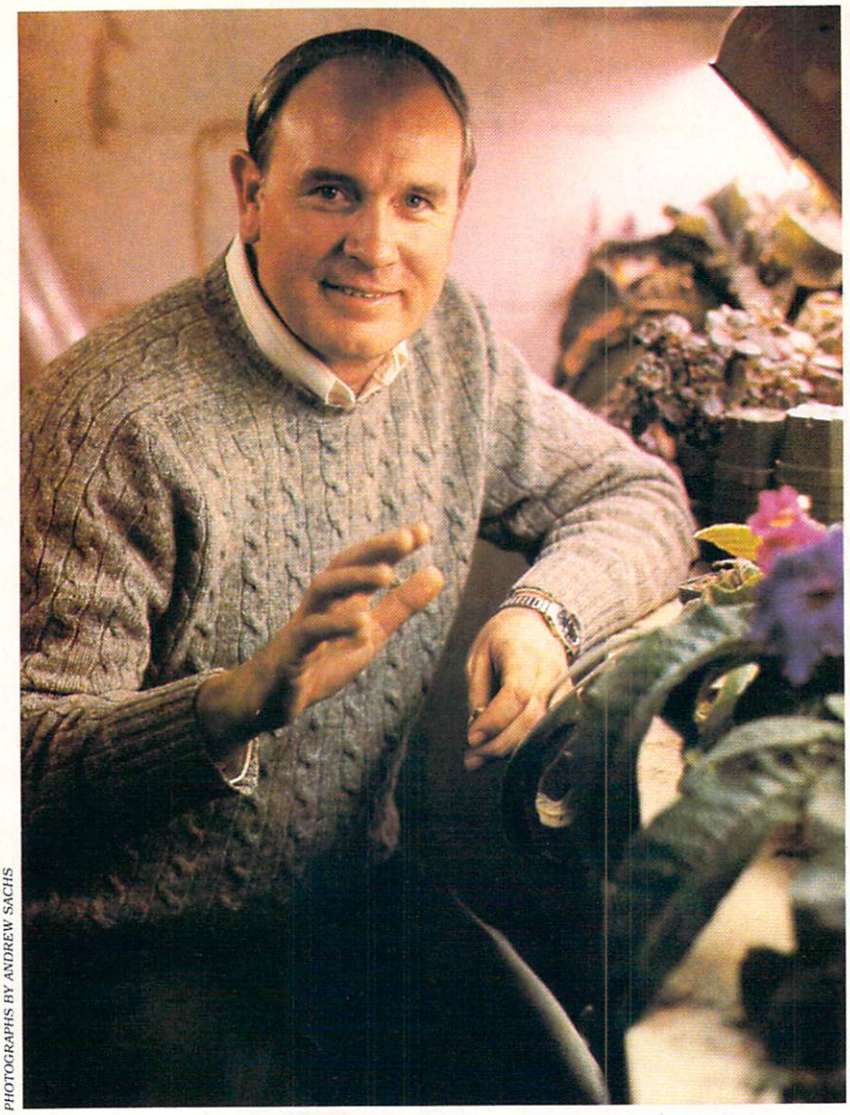

PHOTOGRAPHS BY ANDREW SACHS

With the same care and precision he devotes to his plants (streptocarpus) and his work, Tony Morris set about researching microcomputers and how he would use one with his family. He developed a plan for learning about computers that worked.

How to Program Success Into Your Computer

BY CINDY FRENKEL

DECIDING TO BUY A COMPUTER IS ONE THING. PUTTING IT TO GOOD USE IS ANOTHER. TONY MORRIS AND HIS FAMILY HAVE DONE BOTH. HERE'S HOW.

Thirty years ago or so, Tony Morris's father told stories about catching his son reading under the covers by flashlight. Today, Tony tells the modern-day version of that story—catching his son writing computer programs the same way. That's where the parallel ends.

Like a lot of other families today, the Morrises were toying with the idea of buying a computer for their home. Even back in 1981, when Matt was programming under the covers, all three Morris children had already had some experience with a computer at school—Matt as a nine-year-old fourth grader; Anne as a 13-year-old just starting junior high; and Jon as a 15-year-old just finishing junior high.

Probably the most unusual thing about the family was that both parents had computer experience as well. As a psychology professor and associate chair of his department at the University of Michigan, Tony made frequent use of the terminal that gave him access to the university mainframe. He knew, though, that typing in commands as he did to analyze research data had little to do with understanding a computer.

Penny, on the other hand, had experience programming in FORTRAN, going back to the time when she supported Tony through grad school at the University of Illinois. But that was long before the day of microcomputers. By the time their children grew up, Penny and Tony were convinced, familiarity with a computer would no longer be an optional skill.

"Penny and I are both cautious people," Tony states, "but we readily agreed that learning to use a computer was definitely an essential part of a child's education. To us the ultimate value of feeling comfortable with a computer was as important as part of a college education. That's what led us to spend part of the children's education fund on an Apple II. We believe that even if we can send our kids to college for only three-and-a-half years instead of four as a result of buying our Apple, it will still be worth it."

SETTING A GOAL; MAKING A PLAN

Both Morris parents are concerned with the growth and education of their children, and each is involved with the children independently as well as in whole-family activities. Tony, for example, shares his love of sailing with them on a one-to-one basis; Penny on the

CINDY FRENKEL *is a poet and freelance magazine writer.*

other hand assumes responsibility for most school functions, leaving Tony home to work on his book or his plants. Neither is troubled by this mix of togetherness and independence, though it is unusual in the Ann Arbor, Michigan, community where they live.

Right from the start, that same independence extended to the computer. Already experienced with computers and not bitten by the same curiosity as Tony, Penny has more than enough to do between her work as a research assistant in pediatric hematology at the University of Michigan Medical Center, other family activities, and lots of personal reading. When desktop computers make their way into her workday, as they're slated to do, she may decide to catch up with Tony and the children. Right now, she feels neither the need nor the burning interest.

Tony was on his own when it came to choosing the right computer for the family. "I knew zero about microcomputers," he explains, "so I was in for months of reading and talking and looking to find the computer that would deliver that graphics capability for games, memory capacity for word processing, software availability for all kinds of applications I could only begin to imagine, and dealer support for convenience—all for the money I felt we could afford to spend. The research paid off. We bought an Apple and I've never regretted the decision.

"When I got the computer home, though, I wasn't sure things would turn out so well. At first I was scared we were going to break something," Tony said. "Then I learned we wouldn't." Some of Tony's confidence came from the Apple "tutorial" that came with the computer. "It literally told how to unpack, nuts and bolts, from setting it up to programming. I insisted the kids sit down with me and go through it page by page. And then there was my one rule: No store-bought games for the first two months.

That rule, strictly adhered to, was key to reaching the goal Tony kept in front of him at all times—for him and the children to understand the computer and how it works. "If the kids had used only commercial software from the start," he explained, "they wouldn't have had any curiosity. It would have been too easy." Ultimately, "understanding" translated into "programming."

THE TRANSITION FROM UNEASY TO COMFORTABLE

Most people feel intimidated about learning to program right away. (It's so easy to feel satisfied with yourself for having made the purchase!) Tony was determined to get beyond that block. As soon as the computer was set up, he and the kids began to take games out of magazines and type them in. There were often mistakes in the programs, so they had to debug them and at times even modify some to make them run.

Although Penny Morris had experience programming and felt comfortable with a large mainframe computer in a work situation, she has limited her involvement—so far—with the computer to strong family support, participation in dinner-time discussions, and sharing in decision making with her husband.

"For a few months no program got into the computer unless one of us typed it in," Tony explains. "It was a fantastic learning experience, especially when the author led you through a program and told you how it worked and how to customize it, to make it go faster or slower, for example. I learned more about the computer that way than any other, and we ended up with some games as interesting as store-bought ones. I had to type in a program, which is a very precise task, and watch the way it worked—or didn't work. It can easily take an hour or more. If I'd made a mistake—even if a comma was misplaced—the whole program wouldn't work. I'd have to stop and either go back and compare every line to the magazine or try to figure out where the error was."

The plan seems to have paid off in the eyes of the Morris kids as well. Jon, now 17 and a high school senior, talks about the learning process their dad led them through. "It took the whole thing out of the display case and put it into our hands. It's kind of neat. When you type in a game from a magazine or one that you've created, it's a good feeling. You push a button and it reels off what you want it to do. When we started, none of my friends had com-

Hours of game playing, which so many kids are prone to, never appealed much to Anne, who spends much of each week riding and caring for horses. The time now devoted to the computer used to be spent watching TV.

puters and I wasn't really into them at school yet, so I couldn't really appreciate software. Once I got it I realized how hard it was to do something that seemed easy. You appreciate the complexity of software because you begin to write your own programs."

TAKING THE PLUNGE INTO PROGRAMMING

Both Tony and Penny Morris are obviously pleased that their kids program their own games (fairly simple ones), or at least can if they want to. That was part of their original goal when they bought their computer, but it was only part. "Buying a computer with a specific goal is too limiting," Tony feels. "Parents who buy a computer and say, 'You must learn to program high-resolution graphics,' are making a mistake. It's much better to say, 'Learn how to use it in basic ways and go with what interests you.'

"Particular programming skills, such as a particular language for a computer, might not be around when the kids are in college. I mainly want my children to feel comfortable with computers. Every one of them, however, has learned to program some in BASIC. They began by copying short programs from the "tutorial" and modifying them. One morning when I was home ill, I found a note from Anne: Dad, run 'Dad' on the Apple. When I did, I was greeted by a colorful message spread across the screen: 'Dad—Hope you feel better. Love Anne.' "

So Tony wasn't too surprised when Matt said, "Hey, Dad, I wonder if I could program the Morse code!" He was sitting on the floor studying the plastic case for a GI Joe signal flashlight on which he had found the Morse code.

At first Tony hesitated. " 'How should we go about this,' I wondered. Many of the books I'd read told you to think everything through carefully and to plan it on paper even before you turn on the computer. To me this 'think ahead' approach is excellent for complex programs and for experienced programmers. But I knew we were about to explore together how the computer works and to learn what would happen if we tried different things.

I decided to go with trial and error: Take the problem one piece at a time, try different ways of solving each problem as it comes up, and watch the results. It would take us longer to write a program this way, and the end result would probably not be as elegant and compact as it might be, but I felt we'd learn more about the computer and gain more confidence using it. We knew that if the computer started doing strange things, we could always turn it off and start over! So why not go off on our own adventure in programming? Fortunately it worked, and Matt's first program soon led to many others."

Now Matt enjoys both the games he buys and the ones he makes. The same is true for Anne and Jon. All three believe that they've reaped benefits from the computer. "I learned algebraic skills from the computer," Matt states. "For example, I learned about exponents there first. It helped a lot with my division and multiplication stuff, too." Some of the gains went beyond simply using the machine. "We have more things in common," Anne explains. "I talk about different games with Matt and Jon. It made us smarter in the areas of computers, too. We're not as lost. And we don't watch as much TV." Instead, the Morris kids are playing some games but they're also mastering an ever-growing number of computer applications. At the moment, word processing is a major pastime.

COMMERCIAL PROGRAMS FALL INTO PLACE

Not all the time spent at the computer involves learning. Tony Morris knows there's no way to keep children from the thrill of exciting, commercially produced games. "Parents who

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The favorite of all Morris-family home-developed software.

```
8  REM  *** DRAW GRID ***
10  GR : COLOR= 2:G = 1: HLIN 5,35 AT 15: HLIN 5,35 AT 26: VLIN 5,37 AT 15
     : VLIN 5,37 AT 26: COLOR= 8: GOSUB 1200: GOSUB 1210: GOSUB 1220: GOSUB
     1230: GOSUB 1240: GOSUB 1250: GOSUB 1260: GOSUB 1270: GOSUB 1280
98  REM  *** PLAYER MOVES ***
100 P = 1: HOME : PRINT  TAB( 6)"PLAYER 'X': WHICH SQUARE (1-9)?": GOTO 15
    0
130 P = 2: HOME : PRINT  TAB( 6)"PLAYER '0': WHICH SQUARE (1-9)?": GOTO 15
    0
148  REM  ***RESPOND TO CHOICE***
150  GET S$: IF  ASC (S$) = 13 THEN 10
155  IF  ASC (S$) < 49 OR  ASC (S$) > 57 THEN  ON P GOTO 100,130
160 S =  VAL (S$): ON S GOSUB 200,205,210,215,220,225,230,235,240: IF  SCRN(
    A,B) > 0 THEN  GOSUB 800: ON P GOTO 100,130
165  GOSUB 300: ON P GOSUB 500,700: GOSUB 1000: IF G = 1 THEN  ON P GOTO 1
    30,100
170  GOTO 10
198  REM  ***GET COORDINATES***
200 A = 6:B = 6: RETURN
205 A = 17:B = 6: RETURN
210 A = 28:B = 6: RETURN
215 A = 6:B = 17: RETURN
220 A = 17:B = 17: RETURN
225 A = 28:B = 17: RETURN
230 A = 6:B = 28: RETURN
235 A = 17:B = 28: RETURN
240 A = 28:B = 28: RETURN
298  REM  *** ERASE NUMBER ***
300  COLOR= 0: ON S GOSUB 1200,1210,1220,1230,1240,1250,1260,1270,1280: RETURN

498  REM  *** DRAW X ***
500  COLOR= 9: FOR N = 1 TO 8: PLOT A,B:A = A + 1:B = B + 1: NEXT N:A = A -
    8:B = B - 1: FOR N = 1 TO 8: PLOT A,B:A = A + 1:B = B - 1: NEXT N: RETURN

698  REM  *** DRAW Y ***
700  COLOR= 13: HLIN A,A + 7 AT B: HLIN A,A + 7 AT B + 7: VLIN B,B + 7 AT
    A: VLIN B,B + 7 AT A + 7: RETURN
798  REM  ***SQUARE OCCUPIED***
800  HOME : FLASH : HTAB 3: PRINT "THAT SQUARE IS OCCUPIED. PLEASE PICK": HTAB
    15: PRINT "A NEW SQUARE.": FOR N = 1 TO 2500: NEXT N: NORMAL : RETURN

998  REM  ***CHECK FOR WIN***
1000 R = 6:C = 6: FOR J = 1 TO 3: IF  SCRN( R,C) > 0 AND  SCRN( R,C) =  SCRN(
    R + 11,C) AND  SCRN( R,C) =  SCRN( R + 22,C) THEN 1180
1020 C = C + 11: NEXT J:R = 6:C = 6: FOR I = 1 TO 3: IF  SCRN( R,C) > 0 AND
     SCRN( R,C) =  SCRN( R,C + 11) AND  SCRN( R,C) =  SCRN( R,C + 22) THEN
    1180
1040 R = R + 11: NEXT I: IF  SCRN( 28,6) > 0 AND  SCRN( 28,6) =  SCRN( 17,
    17) AND  SCRN( 28,6) =  SCRN( 6,28) THEN 1180
1060  IF  SCRN( 6,6) > 0 AND  SCRN( 6,6) =  SCRN( 17,17) AND  SCRN( 6,6) =
     SCRN( 28,28) THEN 1180
1100  REM  ***CHECK STALEMATE***
1110  IF  SCRN( 6,6) > 0 AND  SCRN( 17,6) > 0 AND  SCRN( 28,6) > 0 AND  SCRN(
    6,17) > 0 AND  SCRN( 17,17) > 0 AND  SCRN( 28,17) > 0 THEN 1150
1130  RETURN
1150  IF  SCRN( 6,28) > 0 AND  SCRN( 17,28) > 0 AND  SCRN( 28,28) > 0 THEN
    1170
1160  RETURN
1170  HOME : HTAB 15: FLASH : PRINT "**STALEMATE**": FOR N = 1 TO 200:SOUN
    D =  PEEK ( - 16336): NEXT N: FOR N = 1 TO 1000: NEXT N: NORMAL :G =
    3: RETURN
1180  HOME : HTAB 14: FLASH : PRINT "** YOU WIN!! **": FOR N = 1 TO 3: CALL
     - 198: NEXT N: FOR N = 1 TO 1500: NEXT N: NORMAL :G = 2: RETURN
1198  REM  ***DRAW NUMBERS***
1200  VLIN 7,13 AT 10: RETURN
1210  HLIN 19,22 AT 7: VLIN 7,10 AT 22: HLIN 19,22 AT 10: VLIN 10,13 AT 19
    : HLIN 19,22 AT 13: RETURN
1220  HLIN 30,33 AT 7: VLIN 7,13 AT 33: HLIN 30,33 AT 13: HLIN 31,33 AT 10
    : RETURN
1230  VLIN 18,21 AT 8: VLIN 18,24 AT 11: HLIN 8,11 AT 21: RETURN
1240  HLIN 19,22 AT 18: HLIN 19,22 AT 21: HLIN 19,22 AT 24: VLIN 18,21 AT
    19: VLIN 21,24 AT 22: RETURN
1250  VLIN 18,24 AT 30: VLIN 21,24 AT 33: HLIN 30,33 AT 21: HLIN 30,33 AT
    24: RETURN
1260  HLIN 8,11 AT 29: VLIN 29,35 AT 11: RETURN
1270  HLIN 19,22 AT 29: HLIN 19,22 AT 32: HLIN 19,22 AT 35: VLIN 29,35 AT
    19: VLIN 29,35 AT 22: RETURN
1280  HLIN 30,33 AT 29: HLIN 30,33 AT 32: VLIN 29,35 AT 33: VLIN 29,32 AT
    30: RETURN
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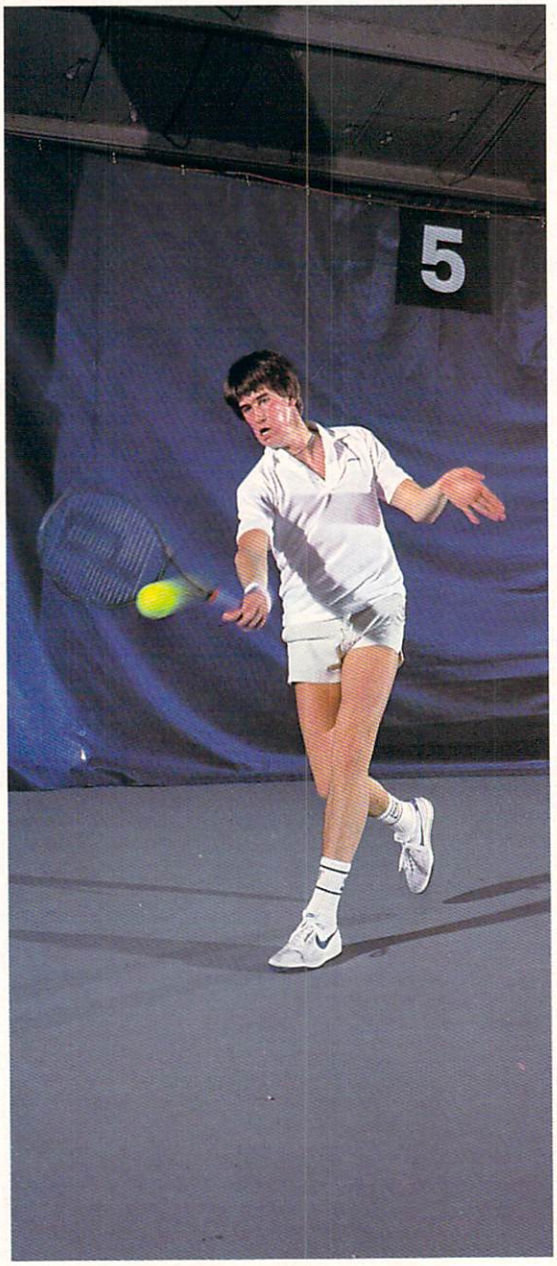


Matt and his friend David Schlecte (left) in the recreation room, where the Morris Apple found its permanent home, shared with a TV and a piano. Jon (right), while becoming increasingly involved with the computer, still spends a lot of time at sports. The computer has been a part of young Matt's life for a proportionately longer period of time and is more a part of his daily routine than of the other Morris children's.

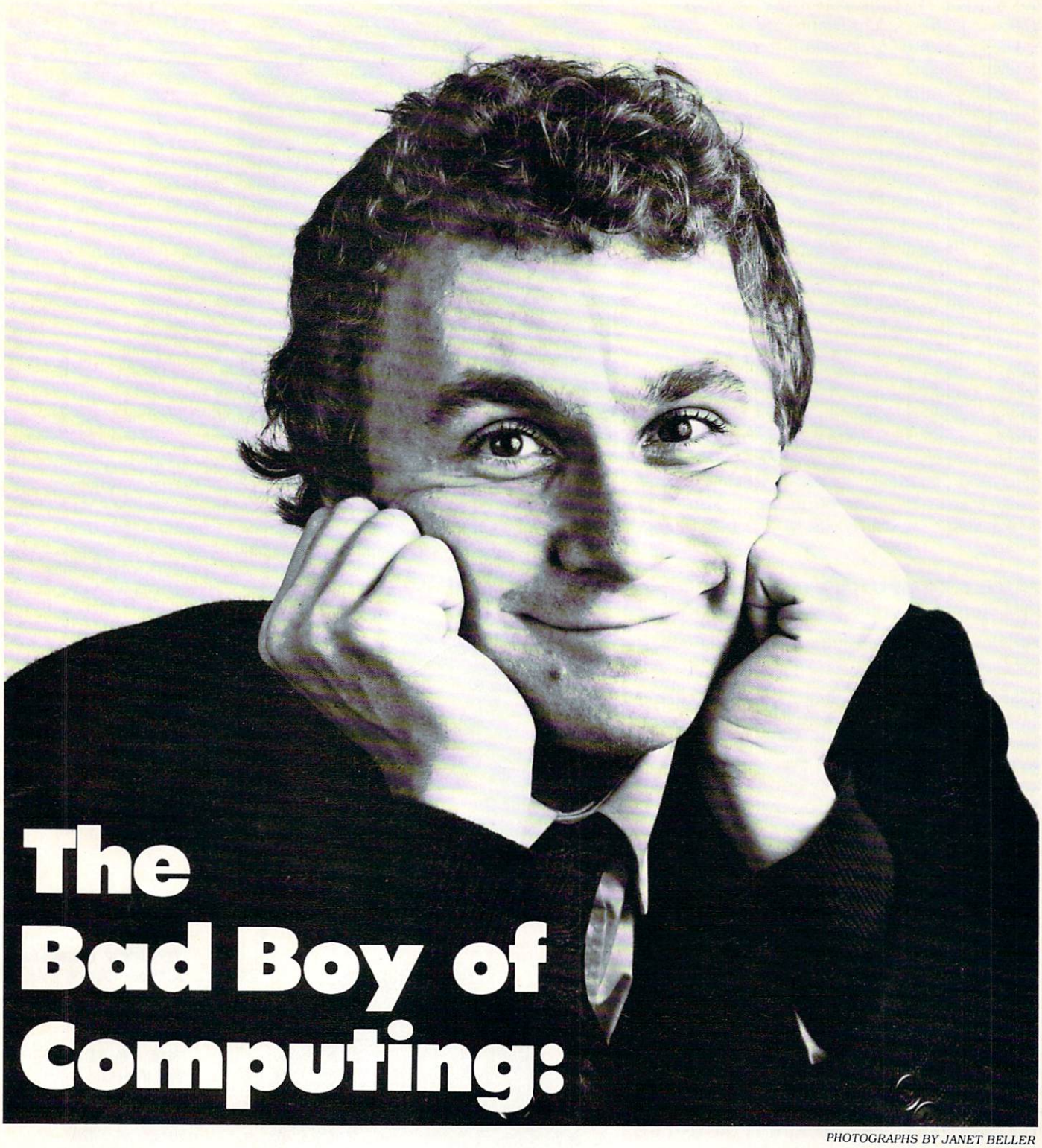
insist on only educational games are fooling themselves," he states. "If the kids don't play the exciting games at home, it'll be hard to keep them out of the arcade."

He marvels at the way so many of the games develop manual skills. "I once said to a friend, 'It's a great ploy of the Defense Department!' These kids are developing the best eye-to-hand coordination I've ever seen!" Any adult who's spent time in an arcade has seen young children's split-second timing and fine hand movements that enable them to escape a rocket falling out of one corner while another's headed at them from a different direction. Tony conjectures, "If you get a team of a hundred kids with a radar screen and say, 'Here are ICBMs coming at our country and you have to defend us, my guess is that the kids could. There's even a game called ABM (antiballistic missile)."

Tony's own favorites for his children are the ones with educational value (particularly a lot of the simulations). "I've also found some of the strategy games helpful. And Anne and Matt really like fantasy games, which I find both most exciting and worrisome. The experience of playing is good, but I'm not too keen on kids playing for hours on end with imaginary creatures." How does he deal with the situation. "When that happens, I'll say, 'Maybe you should go out and play for a while!' "

In general, Tony tends to "trust the kids' instincts and let them play what they want. If game playing makes them feel comfortable with computers," he says, "then I'm all for it. However, if most parents are like me, they didn't invest in an expensive computer just to have their children play games. I'd hate to see kids miss out on the real impact and power of the computer by limiting their use of it to games. In our house, that isn't the case. Both game playing and the computer itself are facets of their lives—but they don't dominate them. All the children have jobs, are busy with school, and enjoy being with their friends. The computer is an important part of their lives, but just one part."

All over the world today parents like Tony and Penny Morris are convinced that their children must become comfortable and skilled computer users. In too many homes, though, the commitment dead ends after they've used the checkbook or charge card. There's no plan for learning about the computer, and the original dreams lose luster. The Morrises knew that buying their computer was only the beginning. For their children, reality is far brighter than the dream. FC



The Bad Boy of Computing:

PHOTOGRAPHS BY JANET BELLER

AN INTERVIEW WITH BEST-SELLING AUTHOR PETER McWILLIAMS

BY JULIA MISHKIN

Peter McWilliams is cheerful, sensible, and reassuring. He's a former advocate of Transcendental Meditation, a college drop-out, and a writer who's taken a decidedly irreverent approach to the newest technology to invade our lives. The 33-year-old L.A.-based author wrote The Word Processing Book *in late 1981, and released it through his own Prelude Press. It was followed four months later by* The Personal Computer Book, *which*

became the fastest selling computer guide on the market. And the books are bargains—at $10 each, they are investments you're likely to keep right next to the computer, if not under your pillow.

McWilliams is flip, but he offers a remarkably easy-to-read, humorous approach to a subject that's usually presented in the most intimidating, baffling manner possible. The author makes no effort to hide his opinions about the different brands of home computers on the market; and he manages to demystify most of the mumbo jumbo often encountered in computer stores and owners' manuals. To further entertain his readers, McWilliams makes frequent use of steel engravings to illustrate his many puns.

It appears McWilliams has found his niche: He's now writing a weekly column "About Computers" that's syndicated in about 40 newspapers. Two more books, Questions and Answers on Word Processing *and* The Personal Computer in Business Book, *are scheduled for publication this fall. And McWilliams doesn't sit still—he's planning a series of books about word processing for specific machines.*

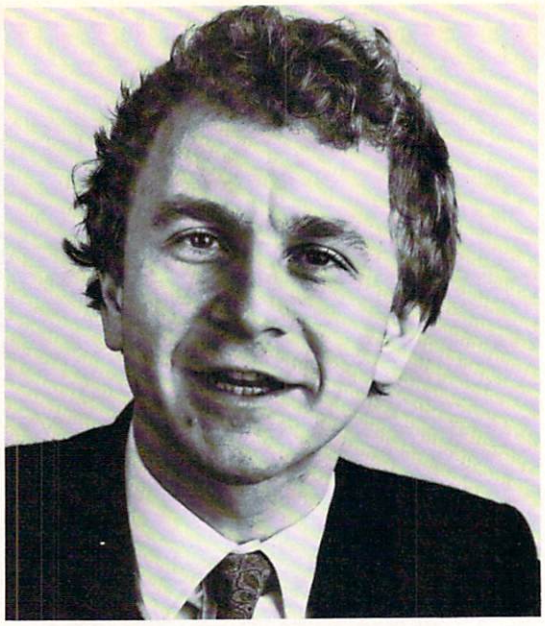
FAMILY COMPUTING interviewed the author during one of his visits to New York.

FC: How do you see computers helping out in the home?

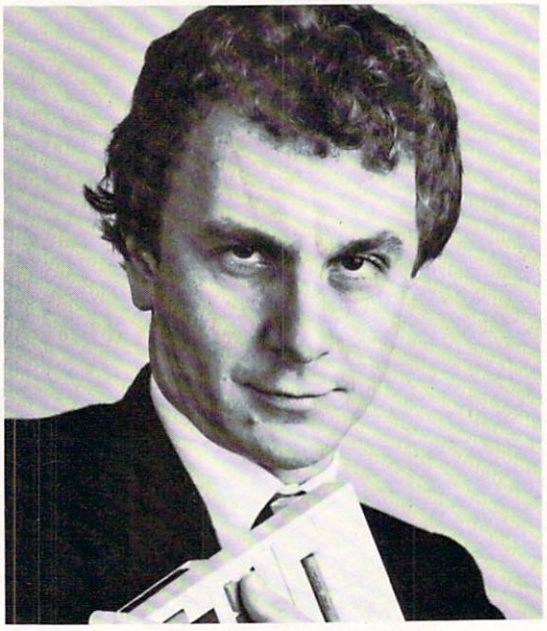
PM: There's no doubt about the fact that the best use of computers in the home is to educate children, or, rather, to facilitate their education. Children seem to love computers and find it much easier to adapt to them than adults do. I got my first typewriter when I was seven, and no one taught me how to use it. I suppose I used the hunt-and-peck method. And I learned to type!

FC: Have you ever seen very young children around computers?

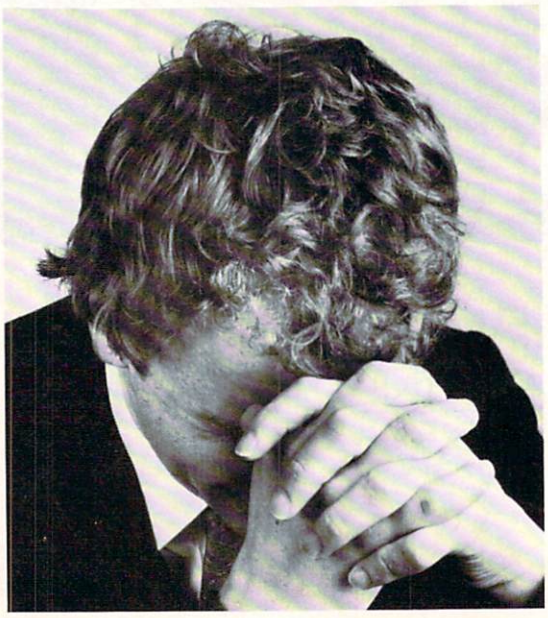
PM: Oh, they love it! Kids are used to television. And suddenly there's this television that responds to what they tell it to do. It's interactive. See, the thing is that every generation has its own technological gimmick, which tends to frighten the older generation, but which the younger generation takes to like mad. It started out with the phonograph and the telephone. The telephone around the turn of the century was viewed as a tool, a necessity, by the first people who bought them, and then the kids started talking on it. They started calling each other! And the parents would say, "No, no, for emergencies only." The next one was radio. At first there was no entertainment value, and then that first generation grew up and the radio took on a whole different dimension in the thirties. At about the same time movies came along, too. And then along came television. I was two when we got our first television, and it became a large part of my life. Of course, the



"WRITING A PROGRAM THESE DAYS IS LIKE TRYING TO RECORD YOUR OWN MUSIC."



"THE FUTURE BELONGS TO THAT KEYBOARD, NOT TO THE HAND HOLDING THE PENCIL."



"EVERY GENERATION HAS ITS OWN TECHNOLOGICAL GIMMICK, WHICH TENDS TO FRIGHTEN THE OLDER GENERATION, BUT WHICH THE YOUNG TAKE TO LIKE MAD."

innovation that made all the difference was the advent of color TV. It turned the generation after me into real TV babies, whereas my generation still turned to movies for much of its entertainment. Color TV is such a realistic medium that it becomes hard to separate that reality from other realities.

FC: In both of your books you concentrated a lot on the drawbacks of computers. What's the most helpful thing you can tell people about the possible drawbacks to using a computer in a family situation?

PM: One of the main drawbacks is that people have to realize that if they hook up their computer to a television, they can't watch the television at the same time they use the computer. Families have traditionally fought over which programs to watch on TV; now they may fight when one of the kids wants to do homework with the computer and everyone else wants to watch TV. Another problem is that many people still think that computers will help them with things like balancing checkbooks and keeping dates. This is not a very effective use of a very powerful tool; it's still a lot more effective to balance a checkbook with a pad and pencil.

FC: Your first computer book deals exclusively with word processing, and you're obviously quite attached to this marvel of technology. Do you think word processing allows you to think more creatively as a writer?

PM: Absolutely; no doubt about it.

FC: Would you recommend it for high school students just beginning to write fiction and poetry?

PM: Sure. In fact, I'd recommend it for kids just beginning to write. Remember when you first started writing, and you could barely control the pencil? And everything looked wobbly and stupid? That's simply not true on a computer; whoever pushes the key can get a very clear letter up there on the screen. The future belongs to that keyboard, not to the hand holding the pencil. It's inevitable; it's sort of like learning to drive. Seventy-five years ago you didn't have to know how to drive; today it's very hard to get around without it. The other person who will be helped by the computer in the home is the parent. I consider curiosity to be one of the most valuable motivations around, and most human beings are very curious. A wise man once said that if you take away all the other stuff, what you're left with is curiosity and love.

FC: What do you think about emphasizing learning to program in the home?

PM: I think that writing a program these days is rather like trying to record your own music. I think you can learn just as much by purchasing a really good piece of software and using it. I spent enough time trying to program in the beginning to realize that this is something that doesn't interest me. Kids do love programming; there's no doubt about it. I guess it's fun for them to experiment. But I think the parents will probably want to see something happen on the computer as soon as they buy it, and for that they'll need some commercial software. There are some spectacular color graphics, for instance, that a kid couldn't learn to do right away, and it's a lot of fun for people to see the capabilities of their machine when they first get it.

FC: What do you see as the future of software?

PM: I think software is going in two different directions. One is for the home user. The other is for business executives. These people can go out and buy a computer for six or seven hundred dollars, and it doesn't do anything. Then they have to spend money on various pieces of software, on a disk drive, a printer, etc., and they end up spending an awful lot of money. If instead they bought an all-in-one machine like an Epson QX-10, with the software built in, they'd be spending less money in the long run.

FC: Do you have a favorite recreational piece of software?

PM: My favorite is a game called *Snafu*, put out by Mattel Intellivision. It's a game of skill and strategy, and I find it really challenging and fun. I think games are valuable in terms of teaching kids mind/body coordination. Of course, you don't get any physical exercise. But then how much exercise did anyone ever get playing *Monopoly*?

FC: There's been a lot of press coverage of your views on the Kaypro. Is it still your favorite computer?

PM: The Kaypro isn't really my favorite; I just think it's the best value with its software package. I prefer the Epson QX-10. In the lower price range, I think the Commodore VIC-20 is good. But the IBM is by far the most supported [i.e., software, servicing] personal computer in the world.

FC: Is it risky for people to buy something right away instead of waiting for more information on new hardware?

PM: No, I don't think they're going to be hurt by that at all. If the machine does what they want it to do when they buy it, it will always do those same things. I'm still using the first machine I ever bought, a North Star. I've had access to lots of other machines, and I've found no reason to switch. However, if I were going into it from scratch, I wouldn't buy the same machine. It's sort of like buying a car. You know newer models are always coming out, with more style and flash; but if you need a car now, you buy the best one you can find, and it usually serves its purpose well. Computers do not become obsolete. And there are always new programs to buy for the computer you bought last year. FC

"IT'S STILL A LOT MORE EFFECTIVE TO BALANCE A CHECKBOOK WITH A PAD AND PENCIL."

Meet Tom Ball: Game Maker

BY NICK SULLIVAN

IN THE EIGHTH GRADE TOM WAS A YEAR BEHIND IN MATH. THEN HE TOOK UP COMPUTERS. NOW HE'S A COLLEGE FRESHMAN AND THE AUTHOR OF TWO NATIONALLY DISTRIBUTED COMPUTER GAMES. THE ROYALTIES WILL PAY HIS TUITION.

"SUCCESS IS PRETTY NICE, BUT THERE ARE BAD ASPECTS. SOME PEOPLE THINK I'M IN IT JUST FOR THE MONEY, AND A LOT OF PEOPLE DON'T CARE."

In another era Tom Ball might have been a pinball wizard or a hot rod mechanic. But he was born in the Star Trek era and started hanging out in a new kind of teen den—a computer store. He became a "computer rat," scavenging information from people and books to learn all he could about the machine. Now 17 and a freshman at Cornell University, Tom Ball can swivel his chair between two computers in his bedroom office, and display two computer games he has helped program and sold to national distributors. Profits from the games (about $30,000 to date) will probably pay his way through college.

Is Tom unusual? Yes and no. Very few people who have personal computers have sold the programs they have designed at home. On the other hand, he's not an intimidating genius, not a Mozart. Tom has an easygoing "boy next door" demeanor and the normal pursuits of a well-rounded young man. In high school, he sang in the New Jersey State Chorus, took piano lessons, and was a member of the high school bowling club.

In fact, though he got A's in advanced calculus as a high school senior, Tom was a full year behind in math in the eighth grade. His computer skills and math skills advanced hand in hand, driven by "his positive thinking, his need to be up-to-date, his desire to learn as much as he can," as Jean Trees, his high school calculus teacher put it.

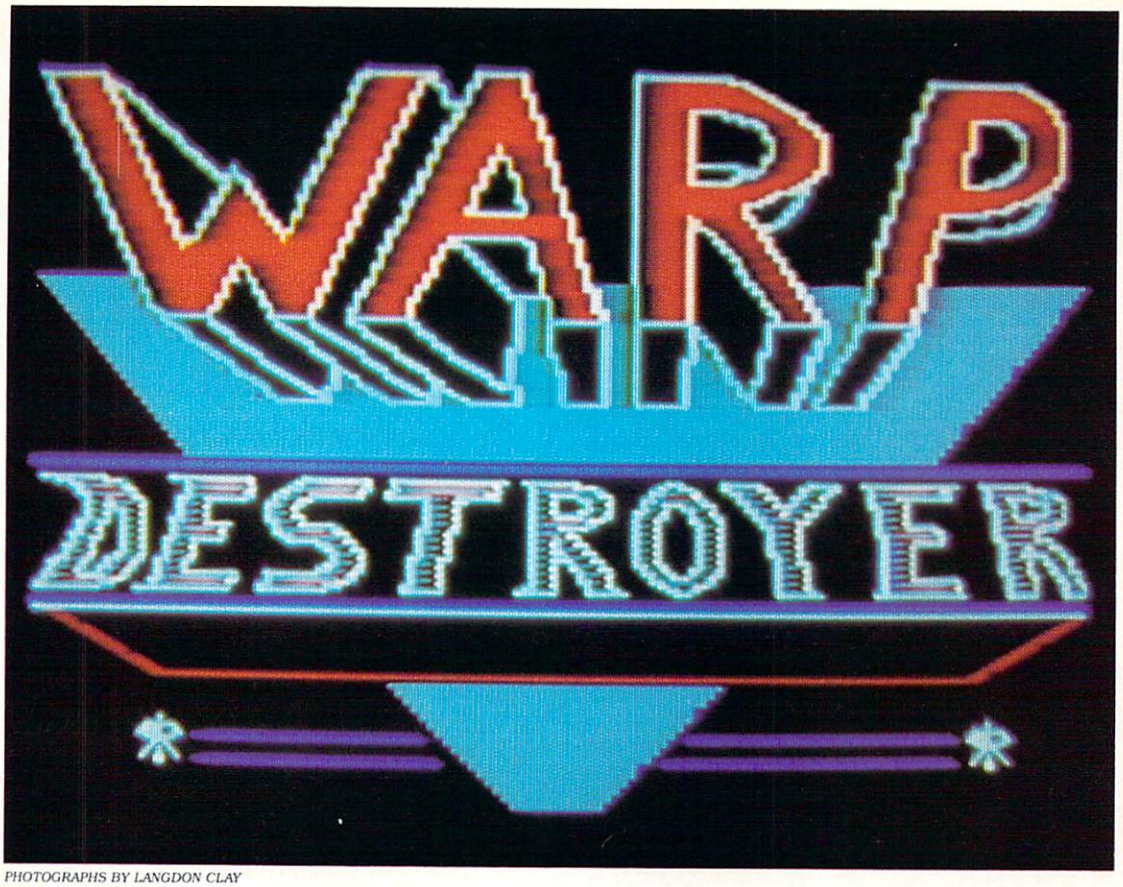
Tom can now converse in an arcane video game lingo—"when you exit subspace you enter the gravity well"—but he can also explain, in simple steps, what he means. That's the way he learned his secrets. "I've learned to think in logical steps," he says. "Doing that, just about anybody could learn the skills needed to program."

Tom's self-starting drive was sparked when the video game *Space Invaders* came out in 1979. Like many teens as far away as Japan, he was fascinated by its speed, movement, and color, and set out to learn how a computer could produce such effects. There were many small steps on this trek and one giant step—meeting Eric Varsanyi.

Tom and Eric met in 1980 at the Stonehenge Computer Shop, just three blocks from Tom's house in Summit, New Jersey. Eric, a high school classmate of Tom's, was working there part time, servicing equipment. "For about a six-month period Tom spent several hours every day in the store, either reading in the corner or pumping our programmers for information," says Dennis Tolley, owner of the store.

Tom already knew more than most tenth graders about computers, having taken a six-week course in BASIC at the Northfield–Mt. Hermon summer school, but he didn't have a computer. Eric did. They started going to Eric's house to experiment on his Apple II, and soon were programming games. "They were what you might call nonmemorable," says Tom, who has a library of these games on disks in his bedroom.

NICK SULLIVAN *is features editor of* FAMILY COMPUTING.



The title page to Warp Destroyer, *the second game sold by Tom and Eric.* Falcons, *their first big hit, was "more complex than* Space Invaders."

PHOTOGRAPHS BY LANGDON CLAY

What Tom and Eric learned from those fledgling games was how to program a computer in machine language. Most microcomputer programs are written in BASIC or PASCAL, intermediary languages that translate the user's keyboard commands into the binary language the machine understands, or machine language. "Machine language is as close to the machine as you can get. It virtually is the machine, its circuit board," says Tom. "And it makes the program run about 50 times faster than an intermediary language does."

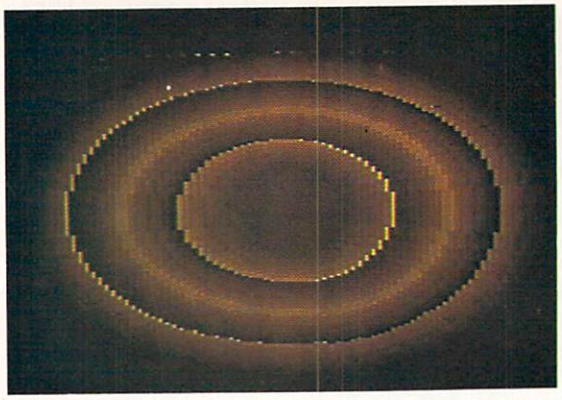
As the duo worked together, a pattern evolved. By sketching on graph paper, Tom designed the graphics that would later show up as explosive color on the video monitor. He then brushed in colors, and developed a program that transferred each square of color on the graph paper to a dot of color on the screen. Eric designed the game's structure, its "logic," by writing out its steps in flow charts. For instance, one program features 16 spacemen, each with 32 possible movements. Outlining these movements on paper gave him a schematic diagram to work from as he created each step of the program.

In the spring of 1981, as their sophomore year drew to a close, the duo got hot. In a feverish three-month period, they programmed a game called *Falcons*, based on an arcade game called *Phoenix*. "It was more complex than *Space Invaders*—faster, more movement, better colors," says Tom. They decided to sell it, a thought which both say had not crossed their minds before. "We were just messing around," says Tom.

With video game hysteria sweeping the country like a communicable disease, all three software publishers Tom and Eric petitioned accepted the game. They decided to go with Piccadilly, a new software marketing company (started by Stonehenge owner Tolley) that was looking for material. *Falcons*, manufactured on floppy disks for the Apple II, got rave reviews, and for a while was selling 1,000 copies a month—a best-seller rate for microcomputer games. In nearly two years *Falcons* has sold 13,000 copies at $30 each, and "will probably sell 150–200 a month for another couple of years," says Tom. It's not in the league of *Space Invaders*, which has sold over 50,000, but very few games have surpassed the 20,000 mark. *Falcons* has also been translated into French for distribution in Canada and France.

When the first royalties drifted in (each programmer gets $2.50 per unit sale), Tom went to Stonehenge and bought an Apple II, his first computer. He and Eric went to work on a second game. But *Warp Destroyer* turned out to be a monster and took 14 agonizing months to program. "The scope of the game was too much," says Tom. "It requires 100K of memory, so we had to keep condensing it to make it fit on one disk for a 48K machine. It's not as good as *Falcons* anyway. It's just a shoot 'em-up game, with very little strategy."

"SOFTWARE CREATORS ARE SLAVES TO HARDWARE MANUFACTURERS," SAYS ERIC.



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LIST

 5 GRAPHICS 9:POKE 712,96
 7 B=PEEK(560)+PEEK(561)*256
 8 C=PEEK(B+4)+PEEK(B+5)*256
10 FOR A=0 TO 6.29 STEP 0.015
20 FOR T=0 TO 31
30 X=COS(A)*(8+T)+40
40 Y=SIN(A)*(24+2*T)+85
50 IF T<16 THEN COLOR T:GOTO 70
60 COLOR 31-T
70 PLOT X,Y:PLOT X,Y+1
80 NEXT T:NEXT A
90 GOTO 90
100 GRAPHICS 9+32
105 POKE 53104,255
110 GOTO 110
200 GRAPHICS 9+32
205 POKE 712,PADDLE(0)
210 GOTO 205

READY
```

A simple graphic design for the Atari 800 (left) and the program Tom wrote to produce the effect (right). Mastering graphics is his primary bent right now.

Warp Destroyer, also manufactured by Piccadilly, has sold about 2,000 copies in nine months. Its sales pace, slower than that of *Falcons*, is largely due to the increasing sophistication of the computer game market, says Piccadilly's Tolley. That sophistication is reflected in new directions for both Tom and Eric, as they head into their college years.

The Gilbert and Sullivan relationship is over. Tom has just programmed a game on his own, *Radar Rider*, that he is fine-tuning and expects to sell to a major software company

"I'VE LEARNED TO THINK IN LOGICAL STEPS. DOING THAT, JUST ABOUT ANYBODY COULD LEARN TO PROGRAM."

IS YOUR GAME SALEABLE?

You've programmed a computer game and think it has sales potential. How do you evaluate it, and how do you sell it? Here are some steps to point you in the right direction.

1. To evaluate your game, the best thing to do is invite friends over to play it. Tom Ball has used this rather informal test market technique on the games he's sold. His advice: "Don't tell them to evaluate the game. Just watch their reactions, then ask a few questions."

A programmer who has spent weeks or months on a game often gets a "warped sense of the game," says Tom. What seems simple to the programmer may be too difficult for the average duffer. Tom recently encountered this problem. A major software company has said that it wants to publish his new game, *Radar Rider*, but has asked him first to simplify it for the mass market.

2. If your game passes the acid test—and proves both fun *and* challenging, but not overly difficult—you're ready to query software publishers. Here, you have two choices—either the publishing division of computer manufacturers, or independent publishers. Computer manufacturers generally offer less money, but their marketing clout enables them to sell more copies. Both Radio Shack and Apple, for instance, have each sold more software than any independent publisher. Independents, on the other hand, respond to queries more quickly, offer more lucrative contracts, and often help to fine-tune a game for distribution. Where you turn also depends on the nature of the game, and what computer it is designed for.

3. Before sending off a cassette or disk, write letters to several publishers describing your game. Should they ask to see the actual game, it's advisable to check with a lawyer before sending it off. You should draw up a "nondisclosure" agreement, so that a software company will not be tempted to pirate the game. For information about the latest developments in computer law, you might contact the Computer Law Association, 6106 Larcom Court, c/o Daniel T. Brooks, Springfield, Virginia 22152.

4. In negotiating a contract with a publisher, should your game be accepted, there are several things to keep in mind. The first is that advance payments against future royalties are rare in the business. The second is that nonexclusive or machine specific deals are better for the programmer, who may then adapt the game for another machine and sell it again. Finally, because the computer game field is so new, nobody has a very good understanding of how the whole process works. Dealing with a company that publishes a lot of titles and advertises regularly, you can expect better treatment. But when dealing with an unknown company, you should request contract provisions that will allow you to monitor sales activity. Some programmers suspect that publishers are not giving them a fair shake on payments.

5. For a complete list of leading game publishing companies, contact the Electronic Industries Association (Consumer Electronics Group), 2001 Eye Street, NW, Washington, D.C. 20006; (202) 457-4919. To find out which companies are hot, check the Softsel and *Softalk* best-seller charts.

In Radar Rider, *the first game Tom designed on his own, the action takes place in the center of the screen. But only part of the maze is visible at any one time. The radar screen (upper right) shows the big picture and the relative positions of all objects.*

soon. Eric, more of a technician, wants to design machines, not software programs. "Software creators are slaves to hardware manufacturers," says Eric, who is a freshman studying electrical engineering at Rensselaer Polytechnic Institute. Tolley says the meteoric team that started in his store made a "nice combination." A local newspaper went further, describing Tom and Eric as "standard-bearers of the avant-garde."

Tom says the attention his success has attracted, including invitations to make appearances on several TV shows, is "pretty nice, pretty nice. But there are good and bad aspects to it. Some people think I'm in it just for the money. Others respect me for the creativity. And a lot of people at school don't know or don't care."

His parents, Dr. Charles Ball, an opthalmologist, and Dr. Eleanor Ball, a dermatologist, are rightfully proud, though his mother does admit to having had some reservations when Tom first brought a computer home. She is a self-described "noncomputer person." But she's relieved that Tom's spare time has not been dominated by computers. In addition to his other interests, he has taken up the electric bass guitar.

His father, who occasionally plays Tom's games ("clumsily"), thinks that computers are better suited for businesses with huge data bases than for the home. But he has taken a six-session course in BASIC, a gift from Tom. His brother Julian, 16, has shown little interest in programming, but is an expert games player who acts as guinea pig when Tom is testing new programming ideas.

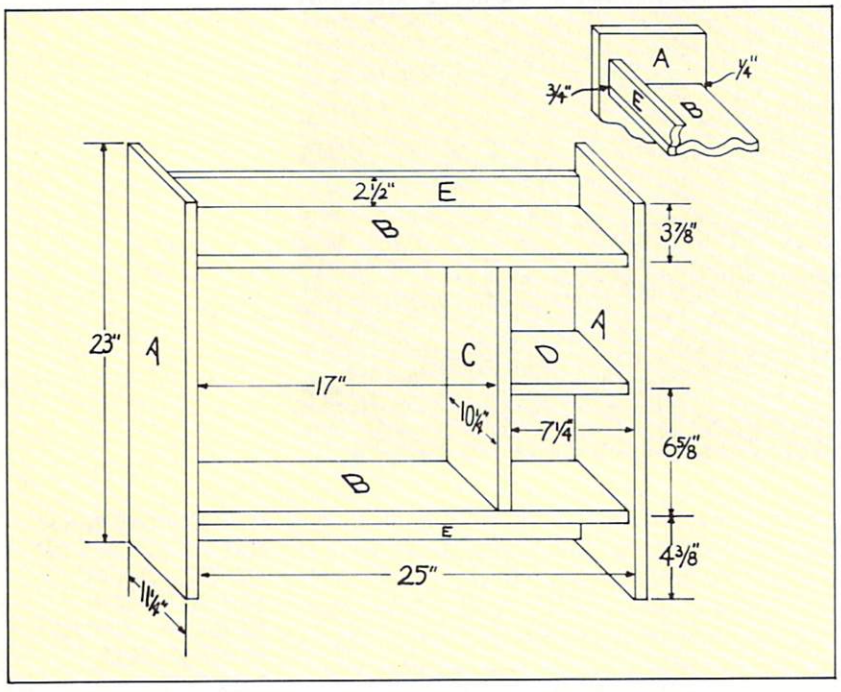
Tom says he is winding down with games. "It's hard to keep them both fun and challenging. Firing shots at things is no big deal after a while." But he has invested some of his recent royalties in an Apple IIe and an Atari 800, and is working on a new game. He bought the Atari because of its "superior color graphics capability," and mastering graphics is his primary bent right now. Nonetheless, he's taking the Apple to college, because he's "more familiar" with it, and leaving the Atari home.

Like many computer owners, Tom is not quite sure where he is headed with the machine. As a prospective computer science major at Cornell, he is eager to experiment with architectural designs. And he mentions the possibility of writing computer programs to make robots more useful. "Studying computers has helped me to think more clearly. It's helped me in math and English, it makes learning music easier, and I've had fun. But, except for one crazy week when we programmed most of *Falcons*, computers haven't dominated my life."

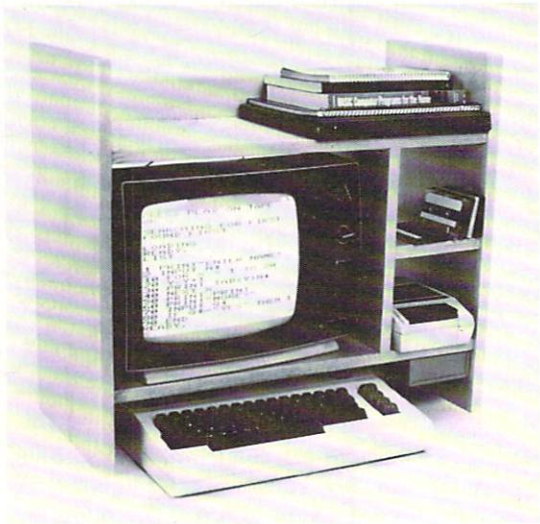
They've just become part of his life, and in the process have helped to bankroll three computers and nearly two years of college expenses. With royalties still rolling in, and a new game coming on the market, it's quite possible Tom will pay his entire way through college. Not many Star Trek babies who later graduated to video game arcades can make that claim. FC

"*FALCONS* WAS MORE COMPLEX THAN *SPACE INVADERS*—FASTER, MORE MOVEMENT, BETTER COLORS."

How to Build a Compact Computer Console for $25



BY GENE AND KATIE HAMILTON



Anyone willing to spend an afternoon in the workshop can build a console for their home computer and tame the chaos of wires and equipment. This easy-to-construct pine unit houses computer, monitor, tape recorder or disk drive, and includes a shelf for storing programs or books. All the wires are hidden in the back of the unit and a single switch controls four plug receptacles, so you can turn on the computer and all peripherals at the same time.

Before you start building, check the shopping list to make sure you have all the necessary materials. We recommend pine because it's less expensive than other woods and easier to cut, but any kind of wood will work fine. The multiplug power strip with a switch can be found in most hardware stores.

Once you've studied the diagram to see how the pieces of the console fit together, grab a saw and proceed to the cutting list. Here are 10 easy-to-follow steps:

Step 1.

Begin by cutting the two sides (marked "A" in the diagram), top and bottom (B), divider (C), shelf (D), and braces (E) to length. Then cut the top, bottom, divider, and shelf so that they measure 10¼" wide. This is to leave space for wiring to run in the back of the console.

GENE and KATIE HAMILTON, *a writing and photography team from Elmhurst, Illinois, are regular contributors to* Home, Sail *and* Family Handyman *magazines. They were design consultants on* 101 Do It Yourself Projects, *to be published by Readers' Digest General Books this fall.*

SHOPPING LIST

Two 1"x12" pine boards, 8' long*
One multiplug power strip with switch
One container white carpenter's glue
One box #4 finish nails
One can Minwax Antique oil

**Dimensional pine boards, available at any lumber yard, actually measure ¾" thick and 11¼" wide.*

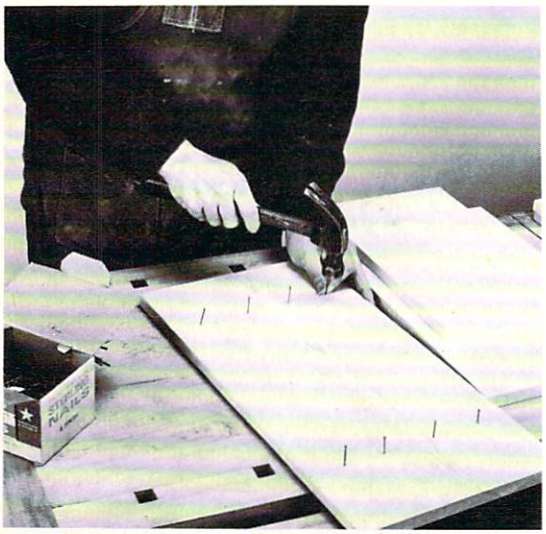
CUTTING LIST

Key	Pieces	Size & Description
A	2	¾" x 11¼" x 23" (side)
B	2	¾" x 10¼" x 25" (top/bottom)
C	1	¾" x 10¼" x 14" (divider)
D	1	¾" x 10¼" x 7¼"(shelf)
E	2	¾" x 2½" x 25" (brace)

Step 2.

Draw two guidelines on each of the side pieces—4⅜" from the bottom and 3⅞" from the top. Drive four evenly spaced #4 finish nails along these lines until their points just penetrate the underside (photo below).

Draw another guideline on the center of the divider (C), 7" from the top, and drive four #4 finish nails along it.



Drive four evenly spaced nails through the sides (A) along your layout guidelines.

Step 3.

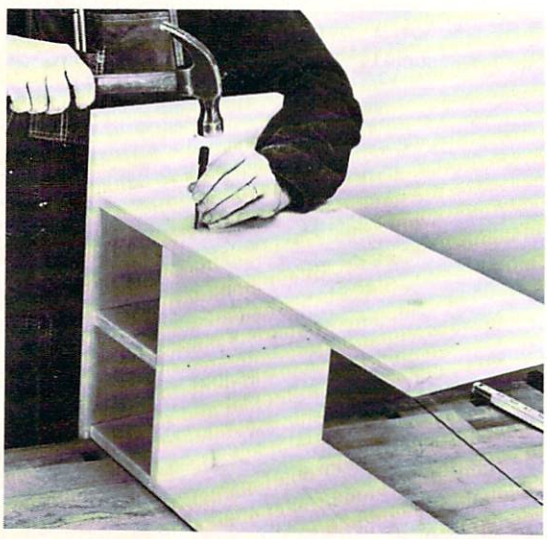
Now you're ready to assemble the right side of the console. Run a bead of glue along the end of the bottom piece (B), and align it with the nail guideline in the side piece (A). Note on the diagram that the sides extend ¼" in front of the shelf/divider unit and ¾" in the rear. Drive the four nails into the end of the bottom piece.

Step 4.

Glue and nail the shelf (D) to the center of the divider (C). Then glue and nail this assembly to the bottom-and-right-side assembly. Check alignment with a T square.

Step 5.

Glue and nail top (B) to the right side and divider, making sure to keep it set back ¼" from the side, or in line with the bottom piece (photo below).



Nail the top (B) to the right side and divider; use a nail set to drive heads below surface.

Step 6.

Turn your console on end and apply glue to the end of the top and the bottom. Checking alignment with a T square, hold and nail the remaining side piece to the top and the bottom.

Step 7.

To finish assembly, glue and nail the braces (E) to the top, bottom, and sides (photo below).

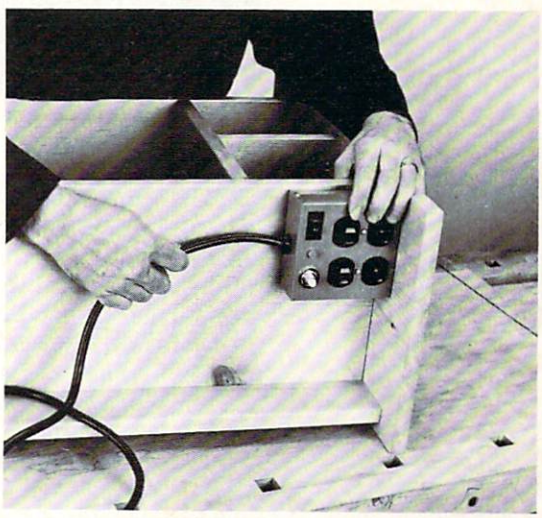
On the back, glue and nail the lower brace (E) to the bottom. Turn the console over and install the upper brace.

Step 8.

Sink all nail heads with a nail set and fill the holes with wood putty. After sanding with #120 sandpaper, you're ready for the finishing touch. We used a natural-colored, easy-to-apply wipe-on finish of Minwax Antique oil, but you may want to paint to match the color of your computer, or your walls.

Step 9.

When the finish has hardened, attach the multiplug power strip to the underside, according to the manufacturer's directions. Make sure you position the switch within easy reach of your fingers (photo below).



Attach the power strip to the underside of console. Position switch in front for easy reach.

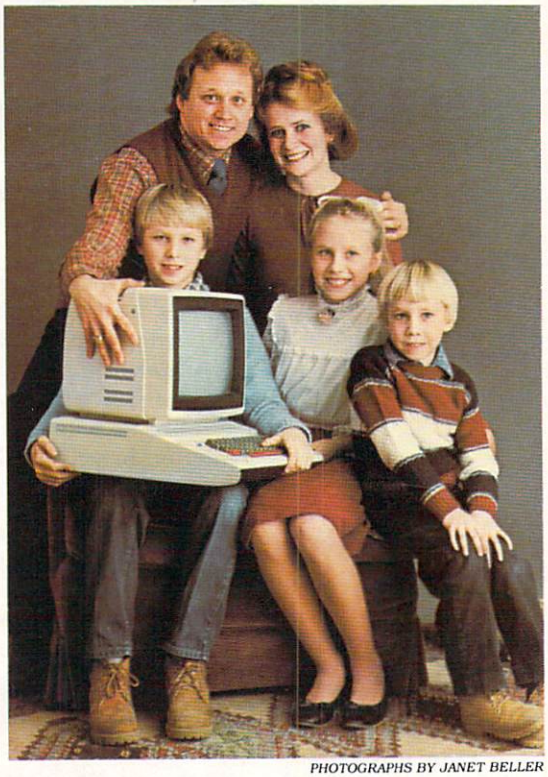
Step 10.

Install the computer and its components, and plug everything into the power strip. Flip the switch, and the whole system will turn on.

Portrait of a Computing Family

PART 1: THE CONNINGTONS BUY A COMPUTER

BY NICK SULLIVAN



The Conningtons (from top left): Chuck, Maureen, Tucker, Janeen, Chip.

PHOTOGRAPHS BY JANET BELLER

The Conningtons just bought a computer. It's shiny and sleek, as full of promise as a crocus bud. Learning to coax full potential from the machine won't be easy. But it has been made easier because the Conningtons have already taken a crash course in computers—by shopping for them.

"It's been an amazing learning experience," says Maureen, a 35-year-old mother of three and part-time nurse. "I went from not knowing what software meant to discussing computers with salespeople. In just a few weeks."

Her husband Chuck, 36, an assistant superintendent in the Recreation and Parks Department in their hometown of Valley Cottage, New York, was equally amazed by the help and advice they got from complete strangers. It was an indication that many others were in the same boat, and learning fast. "Everyone put in their two cents' worth, and you pick up a little each time." After a few weeks shopping and studying, Chuck took on the persona of a salesman himself, lecturing strangers in department stores on the relative merits of different makes and models. "It's just like buying a car or TV," he finally concluded. "You treat a computer as an investment."

The Conningtons did not always want a computer, nor do they consider Silicon Valley and other computer breeding grounds as some kind of mecca. But, like many American families, they have been hearing more and more about computers lately. Chuck's office is getting one, Maureen has seen them at the hospital, her brother and sister-in-law bought one, the TV and newspaper ads are starting to make an impact. More important, the kids use computers at school.

The kids use computers at school. Computers in the classroom already seem so natural that nearly a year passed before the Connington children mentioned the new learning device to their parents. "They don't tell us about overhead projectors, why should they tell us about computers?" asks Chuck. Besides, Tucker (13 years old, seventh grade), Janeen (12, sixth) and Chip (7, second) are avid Intellivision fans, and are used to playing video games at home. In their minds that is—or was—more exciting than finishing multiplication tables before a rabbit runs across the computer screen.

In a way, the Intellivison game opened the door for the Conningtons's computer. It introduced a new kind of technology into a house that already had four TV sets. When Chuck and Maureen heard about the math and science programs the kids were being exposed to at school, they wanted to see some in the house. No such programs were available for the Intelli-

vision. That put the Conningtons into the personal computer market.

GETTING READY

When they made the decision to buy a computer, their first move in a logical operating plan was to set a budget. Five hundred dollars, give or take some change, was the limit. In choosing a make and model, the Conningtons would judge computers by their raw capabilities, add-on potential, size and look, servicing backup, and the software. In assessing software, they decided that educational programs were of primary importance.

Chuck and Maureen set out to research the project as if they were buying a house in a foreign country. They would buy newsstand magazines, check newspaper ads, talk to friends at work and teachers at their children's school. They would also make several expeditions to department and computer stores and grill the salespeople.

A look through several magazines gave them a lineup of well-known computers they recognized listing for under $500. The Conningtons knew little about any of the machines, except that Maureen's brother and his wife had a TI-99/4A and said they were in "seventh heaven" balancing their checkbook.

The children were involved in the decision making from the start. At school they worked out once a week on a Commodore PET, which lent a certain appeal to the two Commodore home computers, the VIC-20 and the Commodore 64. But their parents had mentioned the TI-99/4A and that the Commodore 64 was over budget (the price has since dropped considerably), so the kids favored the TI. Except for Chip, the youngest, who had his heart set on an Apple.

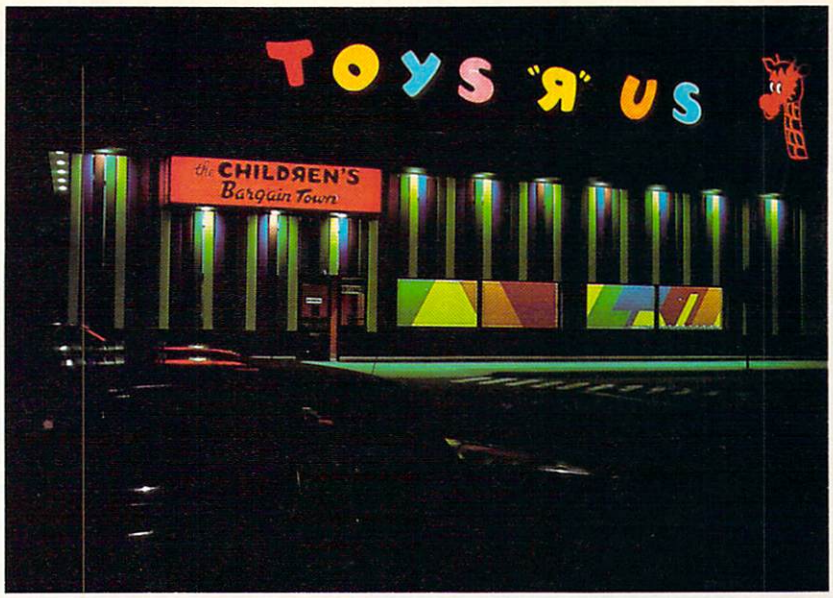
THE HUNT

After several family powwows, the first shopping trip was to a Radio Shack store in a nearby mall. "At this point we felt we knew what we were talking about," says Maureen. "We knew the difference between 16K and 32K." But there were no salespeople on patrol, so they walked through the mall to Sears.

Sears stocks a range of home computers. But, as often happens when people shop for durable goods, the Conningtons set out with one brand name etched in their minds—Texas Instruments. Sears had a TI-99/4A set up for demonstration, but the crowd of onlookers was too large and they didn't get a chance to try it out. Again, no salespeople in sight.

The Conningtons did, however, meet a woman in Sears buying software for her TI-99/4A. She raved about the computer. "We couldn't shut her up," said Chuck. The woman's glowing remarks only confirmed their view that the TI was the machine of the hour. The Conningtons vowed to go back for another look.

The Conningtons felt like veterans on the next venture, a weekday night trip to a Toys "R" Us outlet. Chuck sent the kids off to look at software programs (Chip ended up in the toy truck department) while he and Maureen looked at computers. That is, the TI. After the store's discount and a $100 rebate from the company, it was selling for $149. (It now sells for less.) If they bought eight software programs (about $250), they would get a "free" speech synthesizer. The color monitor cost $350, but Chuck thought a 10-inch color TV would do just as well. Maureen's pencil figuring showed that for about $400, they could buy a computer, a synthesizer, and eight software programs. Not bad.



Toys "R" Us, where the Conningtons found an array of computers in their price range, is one of several chain toy and department stores that now stock computers.

As Chuck told a man looking at a VIC-20, the TI-99/4A offered "great value for the money." His theory was that the TI's memory was big enough (16K) that it would not need to be expanded right away; and it was not so big that the memory might be wasted. It turned out that the VIC-20 shopper and his wife, who were looking to buy a computer both they and their granddaughter could use, had confused the VIC-20 for a Commodore 64 (they are both made by Commodore). With that cleared up, the two men got into an excited dialogue.

THE KIDS WERE EXCITED THAT A DEAL WAS IN THE WIND. THEIR FRIENDS WERE EAGER TO MOB THE NEW COMPUTER.

"Chuck sounds like a salesman," said Maureen. At this point, Chuck's mind was working like a computer. He knew the number of keys, the size of memories, the add-on prices, the available software, for every system under $500. Some snippets from the conversation: "What do they get for that? . . . I saw something in *Time* magazine. . . . Four and change and you get the whole package. . . . Computer prices are going down, but they sock you on the software."

Because the TI was locked in a glass case, the Conningtons went back to Sears to see the demonstration model.

First chance for the Connington children to try out the TI-99/4A. Chuck and Maureen were glad to see the machine in action, but disappointed that the display program was a

Inside Toys "R" Us in Nanuet, New York, the Conningtons study sales literature.

run-of-the-mill game, and not an educational program.

On the way out of Sears the Conningtons bumped into the grandparents. They were the proud owners of a new TI-99/4A. The ex-Commodore shoppers had bought it at another store in the mall and were hurrying back to Toys "R" Us to buy software and get the free speech synthesizer. Amazing! It seemed every department store in the mall was selling computers and accessories at different prices—it paid to take a few escalator rides and comparison shop.

They took the escalator to Radio Shack. A young man, accompanied by his wife, seven-year-old daughter, and infant in a stroller, asked Chuck why he was so high on the TI-99/4A. He had overheard Chuck's spiel in Toys "R" Us and had a rebuttal. "The TRS-80 Color Computer"—flickering before them—"has the best servicing, the best color graphics, and the best software collection. I think I'm going to get one." His wife nodded. His daughter typed her name into the computer and printed it out 20 times.

Chuck and Maureen tried to concentrate on the TRS-80 Color Computer. As in every store they had visited except for Computerland, sales help was hard to come by. And the atmosphere, with several types of music blaring, was carnival-like. Certainly not conducive to clear thinking about fuzzy concepts, about computers. Especially at 9:00 p.m. But sales help came.

"Can I help you?"

"Yes," said Chuck. "Can you tell me why I should pay almost twice as much for the TRS-80 as for the TI-99/4A?"

"You shouldn't. Go buy the TI. Go buy it."

Chuck was taken aback, stammering for a response.

"If you're buying on price, buy it," the salesman said. "But if you're shopping for a computer, not a toy, then you've got three options: Apple, IBM, and Radio Shack. The Radio Shack is cheaper."

Having carefully laid his bait, the salesman then made a key mistake. He underestimated Chuck and Maureen's knowledge of computers. He began glossing over details, telling the Conningtons that everything was built into the machine. He pointed to a TV speaker and called it a synthesizer. He gave the kids a silly game to play, when the Conningtons wanted to see the real stuff, what a computer could do for them.

"We've already got an Intellivision at home. We want to go beyond that," Maureen said as they were leaving.

Chuck was tired and giddy from shopping. "How did we ever get into this mess?" he asked with a grin. "I'll tell you one thing though. You can't expect to go into a store and get much help. You've got to know what you want beforehand."

He spoke the truth. In Toys "R" Us, they saw computers sold next to baseball bats and Nerf balls. In Sears, next to lawnmowers. In some Radio Shacks, beneath the din of rock 'n'

SHOPPING DOs AND DON'Ts

1. Figure out who in the family will use the computer, and for what purposes. When you shop, take a list of these objectives and measure computers against them. Take sales brochures home and read them in your easy chair—it's a better place to think.

2. Even with a list of objectives, you face a "chicken-and-egg" dilemma. That is, "What comes first, the hardware or the software?" Both are of equal importance, but sometimes shoppers get so caught up with the equipment, they don't pay enough attention to the software. But the greatest computer in the world is not much use without the software you want.

3. Ask plenty of questions. Ask the same questions of different people. Then ask more questions. Don't be afraid of appearing "stupid," because there's no reason you should know anything about computers. To meet people who are using the computers you are considering, attend a local user group meeting.

4. Make sure you know what you're getting for the money. You need more than just the keyboard unit, which is what most manufacturers and retailers refer to in their advertising. You also need a cassette recorder or disk drive to run commercial programs, and a monitor or TV to see what's going on. And, if you want copies of your work, you'll need a printer. Many of these add-ons cost more than the keyboard unit itself.

5. Demand a demonstration, and try out any computer you're thinking of buying. Finding a comfortable keyboard is important—pretend you're testing the steering wheel on a new car.

6. Read magazines to see where the industry—and any computer you're considering—is heading. You want to make sure you'll have an array of software and equipment to choose from in the future. In this regard, be wary of promises made by manufacturers or retailers about forthcoming products. They can take months to materialize; and the promises often vanish into thin air.

7. Discounts are great, but there's no "free lunch." Though you pay more when buying from a certified dealer, you generally get better service. If you're buying from a department store or through mail order, find out where you have to bring or send the computer for repair. Sending a computer to Timbuktu is no bargain.

8. Don't rush things. Take the time to comparison shop. As you learn more, your ideas about what you want will probably change.

9. One addendum to the last point. Don't wait for a state-of-the-art machine, unless you prefer twiddling your thumbs to exercising them on a keyboard. There are any number of home computers on the market that will keep you entertained and challenged for several years.

10. If you're having trouble finding a computer that satisfies the needs of everyone in your family, consider this option: Buy a low-end start-up computer for the children (or put their allowances toward it) and another more advanced computer that suits you. This is better, and not much more expensive, than buying a "compromise" computer that satisfies no one.

roll. Stores, in fact, were selling computers just as people were buying them, helter-skelter. Yet, the chaos never deterred the Conningtons. The shopping was still so new it was fun. When they went home that night they were still "leaning toward the TI."

Before the next outing, Tucker came home from school with the news that his math teacher had a Commodore 64, which he highly recommended. The $595 list price seemed high (it has since been lowered considerably), but the Conningtons thought they should investigate. The school connection was very important.

A few days later Maureen spoke to Tucker's math teacher about the Commodore 64 and got the name of a store, Computer Strategies, that sold it. She called and made an appointment. The Conningtons had narrowed the decision to two machines. "We should call TI and Commodore, and get them into a bidding war," said Chuck.

THE DECISION

Chuck met Maureen at Computer Strategies during his lunch hour. He was spiffed up, wearing rose-colored sunglasses and a maroon tie, and very eager to see new merchandise in a new setting. Maureen was wearing her nurse's whites, set for work on the night shift. This was the first time they had looked at a computer without the children.

Several others attended the demonstration, including yet another set of grandparents. An elderly woman hobbled in with her cane and took a seat right in front of the computer and screen. The demonstration program rolled, describing the Commodore 64's graphics capability, its programmable music keys, its clear sound, and its large memory (64K). The saleswoman pointed to the monitor as she talked, to emphasize certain points. The first was price—$495.

A $100 drop. Even without a phone call

AMAZING! EVERY DEPARTMENT STORE WAS SELLING COMPUTERS AT DIFFERENT PRICES.

EVERYONE WAS PUSHING BUTTONS, TUGGING CORDS, QUOTING FROM MANUALS—AND EVERYONE WAS TIRED—SO NOT MUCH WAS ACCOMPLISHED. BUT THEY FINALLY GOT THE COMPUTER TO WORK.

from Chuck, the bidding war was raging.

The cassette player, necessary to run normal household and educational programs, cost another $60. With the cassette player came 14 free tapes holding 200 programs. For about $560 the Conningtons could buy the computer and cassette player. No monitor or TV, but with four TVs at home they had some flexibility. But was it worth it?

The elderly woman asked this question with a thump of her cane. The saleswoman seemed insulted. Software was coming, she said. Since no one had asked about software, her defensive answer made it clear that this was the machine's weak link. As a relatively new computer, less than a year on the market, the 64 didn't have a big library of software, but more was coming. Educational programs that ran on the Commodore PET in schools could be used on the 64 (Maureen nudged Chuck at this news), with the use of an "emulator" cassette. That was free with purchase. The 64's future was rosy.

Chuck and Maureen were very interested. Three points stuck in their minds: 64K was a lot of memory for the money; the kids could use at home the same programs they used at school; and Computer Strategies, as a specialized computer store and authorized dealer, offered instructional classes and expert servicing. It all fit. By the time they reached the parking lot they had virtually decided to buy the 64, but first wanted to discuss it with the children.

The kids were excited that a deal was in the wind. They wanted some equipment in the house and fast, because they had told all their friends, who were eager to mob the Conningtons advertised computer room.

The next day Maureen called the saleswoman and made another appointment. The following afternoon she brought the kids over after school. Chuck got off work early and met them. While the kids messed around in the store's computer classroom, Chuck and Maureen went into the sales office and bought the Commodore 64 and cassette player.

If the Conningtons suffered from buyer's remorse, it was not evident. They picked up two pizzas on the way home, and over dinner rehashed the whole shopping experience. What they remembered most was not computers, because they had seen very few in operation. They remembered the people they had met. In one way or another, each had steered them toward or away from certain models. The more people they had met, the more information they had stockpiled, the better they had honed their own ideas about what computer they needed.

After dinner they set up the computer. They had no color monitor, so they moved the Intellivision off the coffee table and hooked the Commodore into the RCA. Everyone was pushing buttons, tugging cords, quoting from manuals—and everyone was tired—so not much was accomplished. "Whoopee," said Chip with mock enthusiasm. And for one dark second it appeared that the TV had blown out. Chuck was glowering.

But that was fixed and, with Tucker in command, something finally came up on the screen. Even Chip was excited. Maureen served soda and cold champagne. Chuck settled back on the couch, surveying the Intellivision, the Commodore, the RCA, and the Washington and Jefferson plates atop the mantel. "We're early Americans," he said, and clinked glasses with Maureen. FC

This installment of "Portrait of a Computing Family" is the first of two articles on the Connington family.

COMPUTER BUYER'S GUIDE:
A LOOK AT THE LEADING BRANDS

This Buyer's Guide examines seven best-selling computer brands bought for home use: Apple, Atari, Commodore, IBM, Radio Shack, Texas Instruments, and Timex Sinclair. Portables and strictly business-oriented computers are not considered here. Announcements of new models from these and other manufacturers are listed in What's in Store, on page100. The criteria used to evaluate and compare the computers are summarized below.

Memory. The amount of RAM memory a computer has will affect the kind of software it can run. Word-processing, electronic-spreadsheet, and other business-applications software generally require a minimum of 48K RAM to be used effectively. To run game or educational software, or to write programs, you need considerably less memory.

Typically, some of a microcomputer's memory will be preempted by certain built-in programs, such as a BASIC interpreter and an operating system. Thus, even if a computer is advertised as having 64K of memory, not all of this memory will be available to the user.

Finally, the computer's built-in (ROM) memory is not included in the guide's specifications, because it is not

MAKE YOUR OWN CHART

"What do I want from the machine?" The answer provides a yardstick for measuring each computer you examine. The chart is intended as a do-it-yourself Buyer's Guide to help you compare computers. Take it with you when you shop. Write the names of the computers you are considering at the top of the chart. Each item can be answered with a "yes" or a "no," a number or a price.

There's room at the bottom for listing available software, additional languages, and your overall impressions. Don't make your decision on price alone; find the machine that fits both your needs and your pocketbook. See Shopping Dos and Don'ts, on page 61, for other shopping tips.

COMPUTER MODELS	A.	B.	C.	D.	E.	F.
MEMORY: RAM	K	K	K	K	K	K
Optional RAM Expansion	K	K	K	K	K	K
KEYBOARD: Number of Keys						
Typewriter Layout?						
Numeric Keypad?						
Sculpted Keys?						
Flat Keys?						
TEXT/GRAPHICS DISPLAY: Number of Lines						
Number of Characters per Line						
Number of Colors						
Lower Case?						
Resolution	×	×	×	×	×	×
SOUND: Number of Voices						
Number of Octaves						
SOFTWARE AVAILABLE? (for your purposes)						
SERVICING: Established, Reliable Manufacturer?						
Nearby Service Center/Dealer?						
SELLING PRICE (Basic Keyboard Unit)	$	$	$	$	$	$
COST OF PERIPHERALS: Cassette Recorder	$	$	$	$	$	$
Disk Drive	$	$	$	$	$	$
Interfaces/Cables	$	$	$	$	$	$
Memory Expansion (RAM)	$	$	$	$	$	$
Modem	$	$	$	$	$	$
Monitor	$	$	$	$	$	$
Printer	$	$	$	$	$	$
Speech Synthesizer	$	$	$	$	$	$
Software	$	$	$	$	$	$
TOTAL SYSTEM COST	$	$	$	$	$	$
ADVANTAGES/DISADVANTAGES (Record Overall Impressions)						

accessible to the user. Generally, a computer with a larger ROM will have more built-in features, or a more extensive BASIC, with consequently less user-available memory.

Keyboard. The kind of keyboard a computer has will dictate its efficiency for certain tasks. The more keys a computer has, the easier and quicker it will be to use. A typewriter-style keyboard is important for word processing and writing large programs, but less necessary if a computer is to be used primarily for entertainment. For business or home-management applications, a separate numeric keypad, which acts like a calculator, is a big plus. Special function keys, which are used to carry out frequently used instructions, and independent cursor keys will make any keyboard quicker and easier to use.

Video output. Most home computers do not come with a video screen and must be connected to a TV set or monitor acquired separately. A TV provides sufficient image resolution for most casual home use; for more intensive use, particularly where 80 columns of text will be displayed, a monitor is preferable because it provides a sharper, clearer imager. Monitors often require special cables for hookup.

Text display. Most of the computers discussed here offer a 40-column text display, about the maximum number of characters a TV can resolve legibly. Some computers may feature, or offer as an expansion option, the ability to display 80 columns of text. This is standard for word-processing or spreadsheet use. The availability of both upper- and lower-case letters is also important for word processing. Computers featuring special graphics characters or multicolored text modes are desirable for educational or entertainment use.

Graphics. Most of the computers considered have some kind of high-resolution color graphics as standard features. Important factors for comparison are the number of colors available and the range of graphics resolution. This is measured in terms of "pixels" (picture elements), vertically and horizontally. The more pixels, the sharper the screen image.

"Sprite" graphics, or "player missile" graphics, featured on some computers, allow the user to define a variety of graphics objects and manipulate them on the screen.

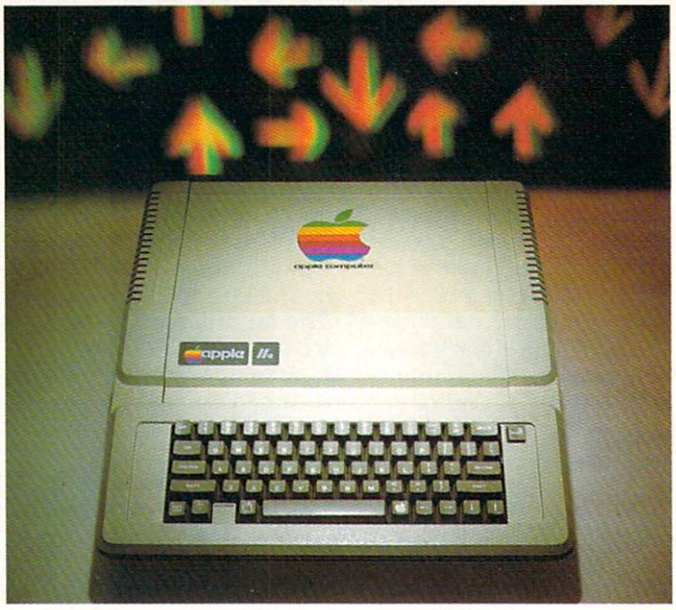
Sound. The computers shown here generally offer from one to four voices, or channels, of musical sound, and cover varying octave ranges. The quality of sound is most important for game playing, or for those who wish to experiment with musical composition. Beyond this, some computers offer speech synthesizers, which can pronounce words.

Languages. Most of these computers come with some form of the BASIC language built in or in plug-in cartridge form. Dialects of BASIC differ, particularly in the area of graphics commands. If your interests lie in programming, search for a computer that supports Extended BASIC.

To be programmed in other languages, most computers require an additional circuit board or specialized software. If young children are to use the computer, languages to look for are PILOT and LOGO, which are becoming increasingly important in education. PASCAL, FORTH, FORTRAN, LISP, COBOL, and other optional languages may be important for the user who wishes to experiment with programming.

Suggested retail price. Prices quoted are the manufacturer's suggested retail price for the Central Processing Unit, or keyboard unit, only. Because retailers commonly discount these prices, you'll be able to find the computers for considerably less than quoted here. Peripherals—such as cassette recorders, disk drives, monitors, printers, and the cables needed to connect them—should be budgeted for and priced separately. A full system can easily run more than $2,000.

APPLE IIe



PHOTOGRAPHS BY LANGDON CLAY

Memory: 64K RAM standard, expandable to 128K
Keyboard: Full typewriter-style, 63 keys
Video Output: TV or monitor
Text Display: 40 char × 24 lines standard; expandable to 80 char; upper/lower case
Graphics: Low resolution: 16 colors, 40 h. × 48 v.; high resolution: 6 colors, 280 h. × 192 v.
Sound: Built-in speaker
Suggested Retail Price: $1,395

The Apple IIe is an enhanced version of the popular Apple II plus, incorporating more memory (64K) and a shift key for upper/lower case text display. Conceived as a general-purpose computer, potential uses for the IIe range from games, entertainment, and education to professional and business applications. Both hardware- and software-compatible with the popular Apple II plus, the IIe already has a huge software and hardware support base in all areas.

AppleSoft BASIC comes built into the computer, and Apple offers its disk-based version of PASCAL as an option. Other programming languages, including C, FORTH, ADA, LISP, and several excellent versions of LOGO, are available from third-party suppliers. With the addition of a Z-80 processor, the Apple IIe can also draw on the vast CP/M library of software.

The Apple IIe keyboard is standard typewriter-style, with a firm, responsive touch. Separate cursor-control keys are provided in convenient locations. The computer comes standard with 64K of on-board memory, enough to run sophisticated software, such as *VisiCalc* or *Apple Writer* with a comfortable overhead. If additional memory is required, the IIe can be expanded to 128K, though only 64K can be addressed by the processor chip at one time. Apple also has made available an 80-column card that doubles the IIe's 40-column text display.

Setting up the IIe to run with disk drives, printers, and other peripherals is generally a simple matter of plugging in the appropriate control or interface circuit board. Slots are provided in the IIe housing for up to eight circuit boards performing various functions. *Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014*

ATARI 600XL

Memory: 16K RAM, expandable to 64K
Keyboard: Typewriter-style, 62 keys
Video Output: TV
Text display: 40 char × 24 lines; upper/lower case
Graphics: 16 colors (256 hues, 128 displayable at once); 11 graphics modes, maximum resolution 320 h. × 192 v.
Sound: 4 voices, 3½ octaves
Suggested retail price: $199

The Atari 600XL, the first of four new Atari computers that will replace the 400, 800, and 1200XL models, is expected to be on the market this fall, although at press time it was not yet available for review. Judging by a prototype model that Atari showed at the Consumer Electronics Show last June, however, the 600XL's capabilities will fall somewhere between those of the current 400 and 800 models. And it will offer several improvements.

It will have more built-in memory (16K RAM) than the 4K 400, and as much expansion potential (64K) as the 48K 800. Its expected typewriter-style keyboard, a welcome relief from the 400's membrane keyboard, will have five more keys than the 800, including a HELP key. Unlike the 400 and 800, which required a plug-in cartridge to load BASIC, the 600XL comes with built-in BASIC. Like the 400, the 600XL will output only to a TV.

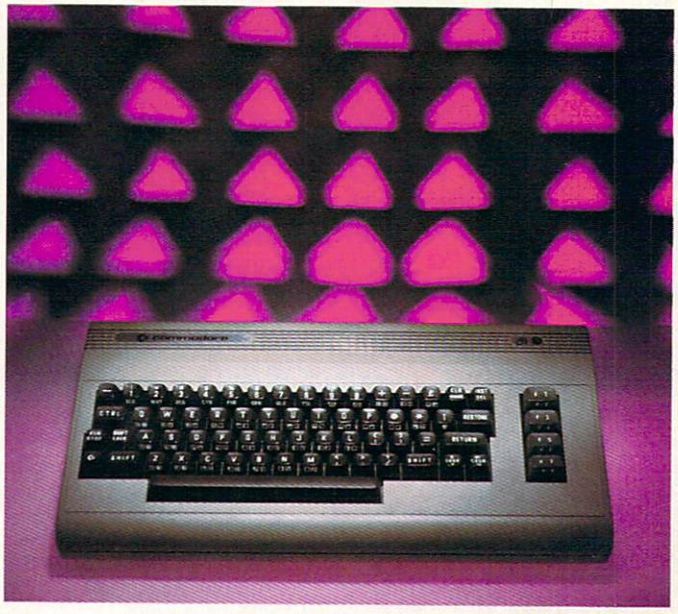
The 600XL promises to keep the same sound and graphics chips that made the earlier models such great gaming computers. On the 400 and 800, for instance, several resolutions and up to 256 colors (actually 16 colors at 16 intensities) are conveniently accessible from BASIC.

Game designers were naturally quick to capitalize on these features, but Atari is also developing a library of educational, business, and word-processing software, in cartridge, tape, or disk format. Atari says that all of this software that can run on a 16K RAM computer will run on the 600XL.

Like the 400 and 800, the 600XL will have one output jack for peripherals, most commonly a program recorder or a disk drive (both made by Atari). To connect a printer or modem, a special interface module ($220) and cables will be required. The 600XL will have only two game-controller ports, compared to the four on the 400 and 800.

After introducing the 600XL, Atari plans to roll out the 800XL, 1400XL, and 1450XLD models. *Atari Inc., 1265 Borregas Ave., Sunnyvale, CA 94086*

COMMODORE 64



Memory: 64K RAM standard, nonexpandable.
Keyboard: Typewriter-style, 66 keys
Video Output: TV or monitor
Text Display: 40 char × 25 lines: upper/lower case
Graphics: High resolution: 16 colors, 320 h. × 200 v.; "sprite" graphics
Sound: 3 voices, 9 octaves
Suggested Retail Price: $595

The Commodore 64 is superbly engineered and has some unusual capabilities. Its keyboard, identical to that of Commodore's popular VIC-20, is typewriter-style, and includes four function keys and two independent cursor-control keys.

With its 64K RAM, it can run some high-powered games and business programs. Though lack of software has been the 64's Achilles' heel to date, a variety of sophisticated spreadsheet, data-management, and finance programs are being developed by Commodore and others.

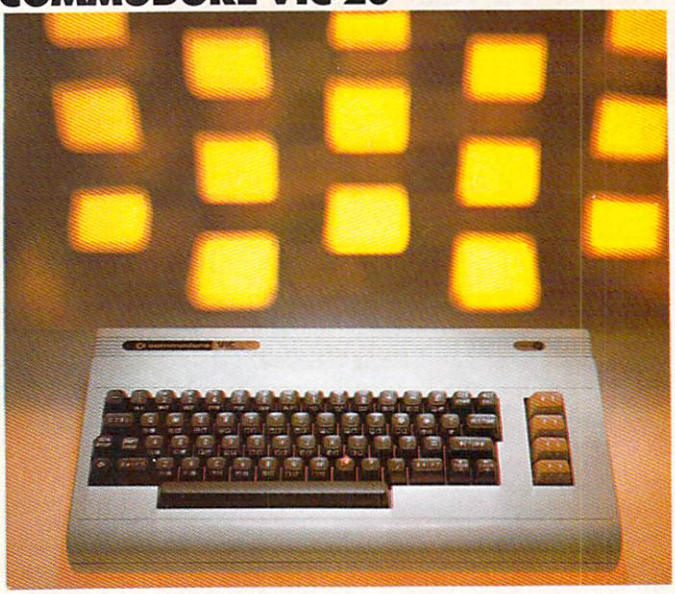
The 64's high-resolution graphics are impressive. In addition to 16 colors, the 64 employs a system known as "sprite" graphics, allowing the programmer to define and manipulate up to eight screen-independent "sprites," or graphics objects. This capability rivals the similar "player-missile" graphics featured on Atari computers.

The sound function of the 64 is a real showpiece, and is arguably the most advanced of any home computer. The computer can be turned into a sophisticated musical instrument, giving the user complete control over every aspect of sound produced. Music-composition software that takes advantage of the 64's unique sound features has been released by Commodore, and speech synthesis software has been promised.

The 64 has a standard 40-column text display. Devices to expand this display to the 80-column word-processing standard are becoming available from third-party suppliers, though it should be noted that some of these hardware add-ons produce a less than optimal display quality. In addition to upper/lower case text, the 64 has an extensive graphics character set.

The 64 may be hooked to all the VIC peripherals, including the Datassette recorder (a regular tape recorder may not be used), 1541 disk drive, VIC modem, and printer. The 64 will accept plug-in cartridges, but not those made for the VIC-20. The 64's operating manuals are hard to follow. *Commodore Business Machines, 1200 Wilson Dr., West Chester, PA 19380*

COMMODORE VIC-20



Memory: 5K RAM standard, expandable to 32K
Keyboard: Typewriter-style, 66 keys
Video Output: TV or monitor
Text Display: 22 char × 23 lines; upper/lower case
Graphics: 8 colors, 176 h. × 184 v.
Sound: 3 voices, 5 octaves, one "white-noise" voice
Suggested Retail Price: $199

The VIC-20 offers enormous flexibility and power for the price, and can be expanded with a full line of peripherals. The full-size, typewriter-style keyboard is of extraordinarily high quality and is comfortable to use. The keyboard features four programmable function keys and two separate, shift-operated cursor-control keys for easy editing.

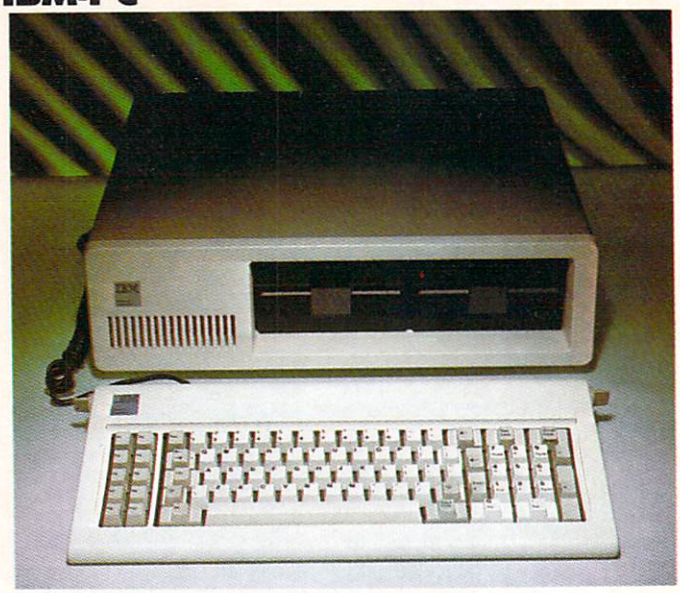
The VIC's 5K RAM may be expanded to 32K. Commodore also offers plug-in cartridges incorporating RAM and/or special enhancements. The Superexpander cartridge, for example, is designed to provide memory specifically for use in high-resolution graphics.

The VIC's 22-character line display is shorter than that of most competing models. Text has a stretched-out look that can make large blocks difficult to read, though in most home applications this should not matter much. An extensive graphics character set is supported in addition to upper/lower case. The VIC's high-resolution display offers a choice of up to eight hues. Its sound generators provide up to three simultaneous voices and a sound-effects channel.

The VIC can be connected to a variety of Commodore peripheral devices. The Datassette recorder is required for cassette mass storage. This device operates entirely under computer control, eliminating the usual cassette recorder play-and-rewind hassles. The Commodre 1541 disk drive ($399) offers 170K of storage space. A dot-matrix printer ($395), which can reproduce the VIC's graphics characters as well as normal characters, is also available from Commodore.

Games and educational software stand out in the VIC-20 software library, though a good deal of home-management software and even word processing are also becoming available. Though serious business users will have to look elsewhere, the VIC-20 has great appeal for the novice home user, hobbyist, and student. *Commodore Business Machines, 1200 Wilson Dr., West Chester, PA 19380*

IBM-PC



Memory: 64K RAM standard, expandable to 640K
Keyboard: Typewriter-style, 83 keys
Video Output: TV or monitor
Text Display: 80 char × 25 lines; upper/lower case, black and white; 40 char × 24 lines, color
Graphics: Graphics board required for color output; 16 colors in basic text mode; 2 resolutions, 320 h. × 200 v. with 4 colors, and 640 h. × 200 v. with 2 colors; text and graphics can be mixed on screen
Sound: Built-in speaker
Suggested Retail Price: $1,355

Powerful, expensive, and complex—but not necessarily complicated—the IBM-PC runs some of the friendliest and most sophisticated software around, from games to full-scale business applications. The PC was not designed as a home computer, but people—especially those with business needs in mind—are bringing it home.

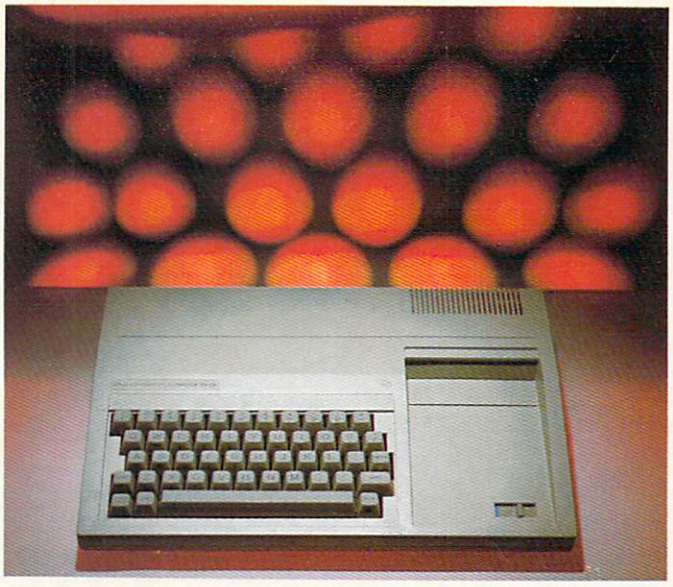
The main portion of the PC keyboard is typewriter-size and laid out in a more or less conventional fashion, but touch typists may find the placement of its RETURN and SHIFT keys slightly idiosyncratic. This design flaw is surprising from the company that set the standard for typewriter keyboards. Nonetheless, the keyboard has a feel much like that of an electronic typewriter, ideal for text entry.

The basic PC system comes with 64K of RAM memory, and can be expanded to 640K RAM, enough to run full-scale business programs. With the monochrome display and printer adapter ($335) installed (necessary for use with a monitor), the PC's standard text display is 80 columns by 25 lines, upper/lower case.

With the IBM graphics board installed, 16 colors are available at a maximum resolution of 320 by 200. IBM's BASIC provides a range of graphics commands, giving the chart maker control over color, line, fill, and a variety of geometric forms. Besides the powerful built-in BASIC, the PC can be programmed in a host of other languages.

Largely because of the IBM name, the PC is rapidly becoming an industry standard, and observers expect its forthcoming home computer, code-named "Peanut," to strengthen that position. Perhaps more new software is targeted to run on the PC than on any other computer. The PC owner can find software for virtually any business application as well as varieties of games and, to a lesser extent, educational software. The PC can interface with a huge variety of peripherals. *IBM Personal Computers, P.O. Box 1328, Boca Raton, FL 33432*

TI-99/4A



Memory: 16K RAM standard, expandable to 52K
Keyboard: Typewriter-style (but undersized), 48 keys
Video Output: TV or monitor
Text Display: 32 char × 24 lines standard; 2 additional text modes offering enlarged, multicolored text
Graphics: 16 colors, 256 h. × 192 v.; "sprite" graphics
Sound: 3 voices, 5 octaves, 1 noise generator
Suggested Retail Price: $225

The TI-99/4A elicits both strong positive and negative reactions from its users. Its high-resolution, easy-to-manipulate color graphics and large variety of educational software, including TI LOGO, get high marks. Its unusual BASIC and small keyboard get mixed reactions.

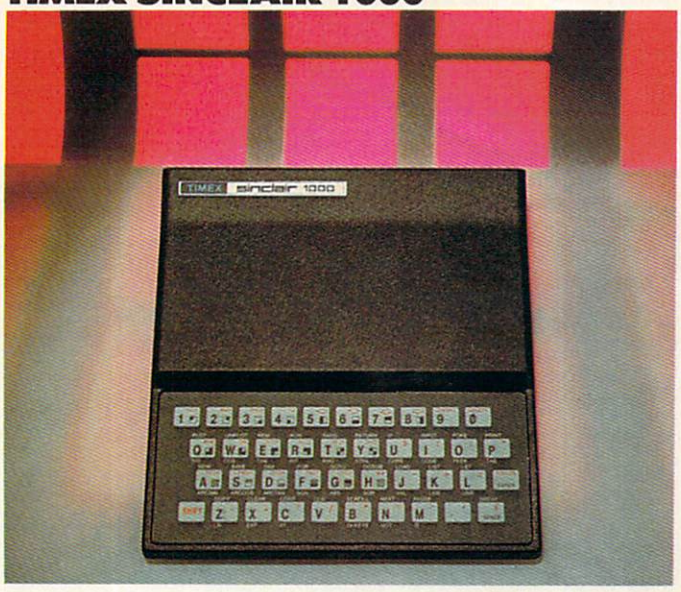
The keyboard is typewriter-style, with most keys laid out in a conventional fashion. Some other keys are unusually placed, and oft-used special characters (quotation marks, for example) and cursor controls require some fancy typing. The keyboard as a whole is small, about two thirds the standard size, and this in combination with its 32-character, wide-screen display means the TI-99/4A is not good for word processing or large-scale text entry.

Much TI software comes in cartridge form, making it convenient for children. The TI's cartridge slot is better designed than that of some of its competitors, allowing easy access for cartridge insertion and removal. A regular cassette recorder (with a special cable) and a disk drive ($400, plus a $250 disk controller and a $250 peripheral-expansion unit) may also be used to load programs.

To expand the 99/4A's 16K RAM to 48K requires an additional 32K expansion card. To expand to 52K, you need TI's Mini Memory cartridge. Both the TI BASICs are nonstandard, somewhat complex, and extremely powerful, allowing simple manipulation of graphics characters and animation. Though the TI may be operated with a standard color TV set, graphics fans will appreciate the optional TI color monitor that, though expensive, offers superb resolution.

TI backs the 99/4A with a large software library. The software focuses on games, home finance, and record keeping, with educational software running close behind. Word-processing and advanced home-business applications software programs are conspicuously absent. *Texas Instruments, Inc., P.O. Box 53, Lubbock, TX 74908*

TIMEX SINCLAIR 1000



Memory: 2K RAM, expandable to 64K
Keyboard: Flat plastic membrane, 40 keys
Video Output: TV
Text Display: 32 char × 22 lines; uppercase
Graphics: Black and white, 64 h. × 44 v. ; text and graphics may be freely mixed
Sound: None
Suggested Retail Price: $49

Even though it's the least expensive computer on the American market, the TS 1000 is a remarkable full-featured machine. It's a wonderful computer on which to learn programming.

The TS 1000 housing measures only 6½ inches across and deep, and the flat-membrane keyboard covers about half this area. This makes it difficult for most adult fingers to use. To ease the typing burden, each of the TS 1000's keys have been made multifunctional, and all Sinclair BASIC keywords, commands, and functions may be entered by a single keystroke.

The TS 1000 comes with only 2K of internal memory, yet entertainment software is available to run on the unexpanded machine. Memory can be expanded to 16K, with a plug-in cartridge from Timex, or to 32K or 64K through third-party manufacturers.

The black-and-white text display of the TS 1000 is crisp and easy to read, and text may be mixed with low-resolution graphics. An extensive graphics character set includes special textured and striped forms for use in graphics and bar charts.

Sinclair BASIC is a full-featured dialect of the BASIC language, as sophisticated as many BASICs on more expensive computers. Any cassette recorder can be used to store programs written in Sinclair BASIC. Unfortunately, it takes an ingenious programmer to get other information filed on tape, making the TS 1000 useless for extensive record keeping or data storage.

Besides the memory-expansion pack, the only TS 1000 peripheral currently available from Timex is a 40-column dot-matrix printer, priced at about $100. Third-party suppliers already offer a variety of peripheral options including high-resolution graphics hardware, parallel printer interfaces, sound generators, modems, and a disk drive.

The best of the several hundred software programs available include *Vu-Calc*, an efficient mini-spreadsheet, and Timex *Chess*, a sophisticated game offering challenging play at many levels. *Timex Computer Corp., P.O. Box 2655, Waterbury, CT 06720*

TRS-80 COLOR COMPUTER

Memory: 16K RAM, expandable to 32K
Keyboard: Full-size calculator-style, 53 keys
Video Output: TV
Text Display: 32 char × 16 lines; uppercase
Graphics: 5 graphics modes, ranging from 64 h. × 32 v. with 8 colors, to 256 h. × 192 v. with 2 colors
Sound: Single voice
Suggested Retail Price: $299

The TRS-80 Color Computer, nicknamed "CoCo," offers a large library of plug-in cartridge games, excellent documentation, and technical support from the 8,500 Radio Shacks worldwide.

The Color Computer keyboard is typewriter-size and is arranged in a standard fashion, though the keys themselves are small and function somewhat like those of a calculator. Children and hunt-and-peck typists may find the widely spaced keys of the CoCo easier to manipulate than more conventional setups. As a whole, the keyboard is well laid out, with a full-size RETURN key and space bar, and four separate cursor-control keys.

The basic Color Computer comes in two standard forms, both carrying 16K RAM. The less expensive of these features Radio Shack's Standard Color BASIC, a no-frills language designed for easy learning and simple applications. At an extra cost, the CoCo may be purchased with Extended Color BASIC installed ($100 extra). The more powerful version of BASIC features enhanced color graphics and sound commands, quite similar to the Extended BASIC that comes with Radio Shack's more expensive Model III and Model IV personal computers.

Unfortunately, the CoCo is incompatible with the wide range of software produced for its siblings in the TRS-80 line. But, it may be programmed in PILOT and Color LOGO, both "turtle graphics" languages widely used in education. A large number of arcade-style games are in the stores, as is graphics software for use with the CoCo graphics tablet. Business and home finance programs are also available, including a sophisticated spreadsheet program. With the addition of a modem and terminal software, the Color Computer can serve as an excellent, low-cost telecommunications terminal, and this is becoming one of its most popular home applications. *Radio Shack/Tandy Corp., One Tandy Center, Fort Worth, TX 76102*

TRS-80 MODEL IV

Memory: 16K RAM (cassette), 64K RAM (disk), expandable to 128K
Keyboard: Typewriter-style, 70 keys
Video Output: Black-and-white monitor built in
Text display: 4 text modes: 80 char × 24 lines, 64 × 16, 32 × 16, 40 × 24; upper/lower case
Graphics: Black and white, 128 h. × 28 v.
Sound: Single voice
Suggested Retail Price: $999 (cassette); $1,699 (single disk drive); $1,995 (2 disk drives)

The TRS-80 Model IV is a vastly improved and updated version of Radio Shack's popular Model III computer, and can run the extensive library of existing Model III software, as well as handle more advanced applications. Compared with the Model III, the IV has a larger memory, a better operating system, and a wider text display. In capacity, the Model IV is comparable to the Apple IIe: a fairly big system capable of running sophisticated business- and word-processing applications software.

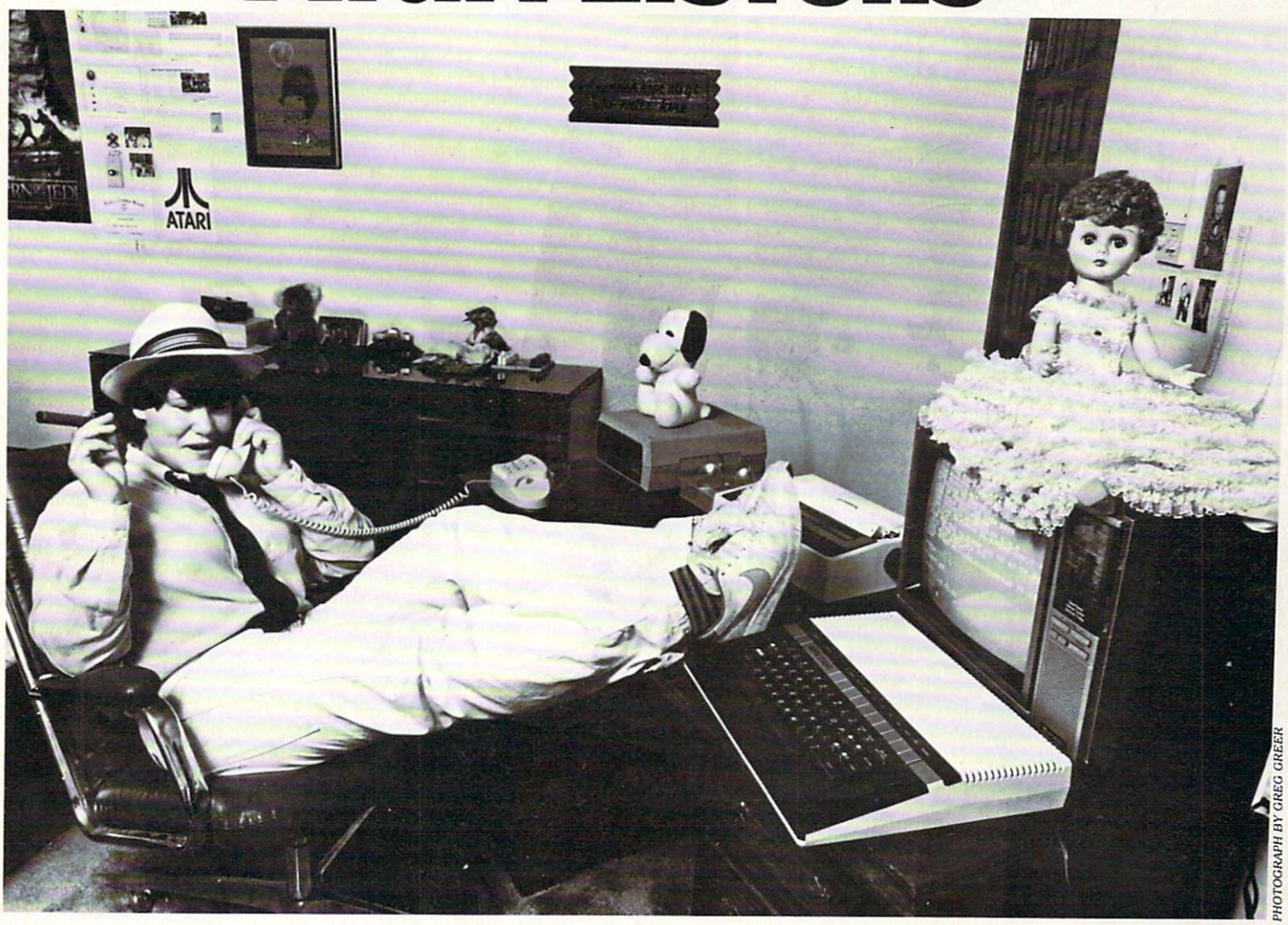
The Model IV is designed as a unit, incorporating a 12-inch black-and-white monitor in its basic housing, with space for two disk drives. The keyboard is standard typewriter-style, a comfortable professional tool including separate numeric keypad. Control and function keys are white for visibility, while the remainder of the keyboard is darker. The monitor is slanted backward for easy viewing. Radio Shack and third-party manufacturers offer a wide variety of peripherals.

Standard memory for a minimal cassette-based Model IV is 16K. However, the system is available in single- and two-disk 64K versions as well. The Model IV's memory is expandable up to 128K via plug-in circuit boards, though not all this memory can be used at once.

Like the other TRS-80 computers, the Model IV is weak in the sound and graphics department, with only one voice and low-resolution black-and-white graphics.

The Model IV operating system (TRSDOS 6.0) offers a wide variety of file-management options, broad peripheral compatibility, and sophisticated programming aids. In addition, the Model IV can also run the latest and most complete version of the popular CP/M operating system. With all these options, a wide variety of software already exists for the Model IV. *Radio Shack/Tandy Corp., One Tandy Center, Fort Worth, TX 76102*

When Kerrie Holton Talks, Atari Listens



PHOTOGRAPH BY GREG GREER

A NEW ORLEANS TEENAGER HAS OPINIONS THAT COUNT

BY BETHANY KANDEL

Kerrie Holton wasn't used to being stared at. In fact, when she wandered the halls of her New Orleans high school, she didn't attract any special notice; the 18-year-old is the "quiet" type. But last winter, Kerrie was the center of attention at Isidore Newman High School. Her fellow students whispered knowingly as they pointed to her in the hallways. But Kerrie didn't mind, she simply smiled. She knew that the grapevine was buzzing with the news that a classmate had just sold a computer game to Atari for a million dollars.

The truth was that Kerrie had been working on a computer game, but she hadn't yet sold the first line of code. What inspired all the gossip?

While other seniors were busy bragging about which college they'd been accepted to, Kerrie had something else to show off—she'd been chosen to serve on the Youth Advisory Board (YAB) of Atari, one of the best-known video game and computer companies in the country.

Plenty of high school students have sat in study hall daydreaming about a V.I.P. tour of the inner sanctums of Atari, Inc.; Kerrie is one of the few who've been there. She took a private tour last spring, and was included in meetings with top officials, and discussions of Atari's confidential plans for software and hardware development.

BETHANY KANDEL *is a New York freelancer who writes about families and computers.*

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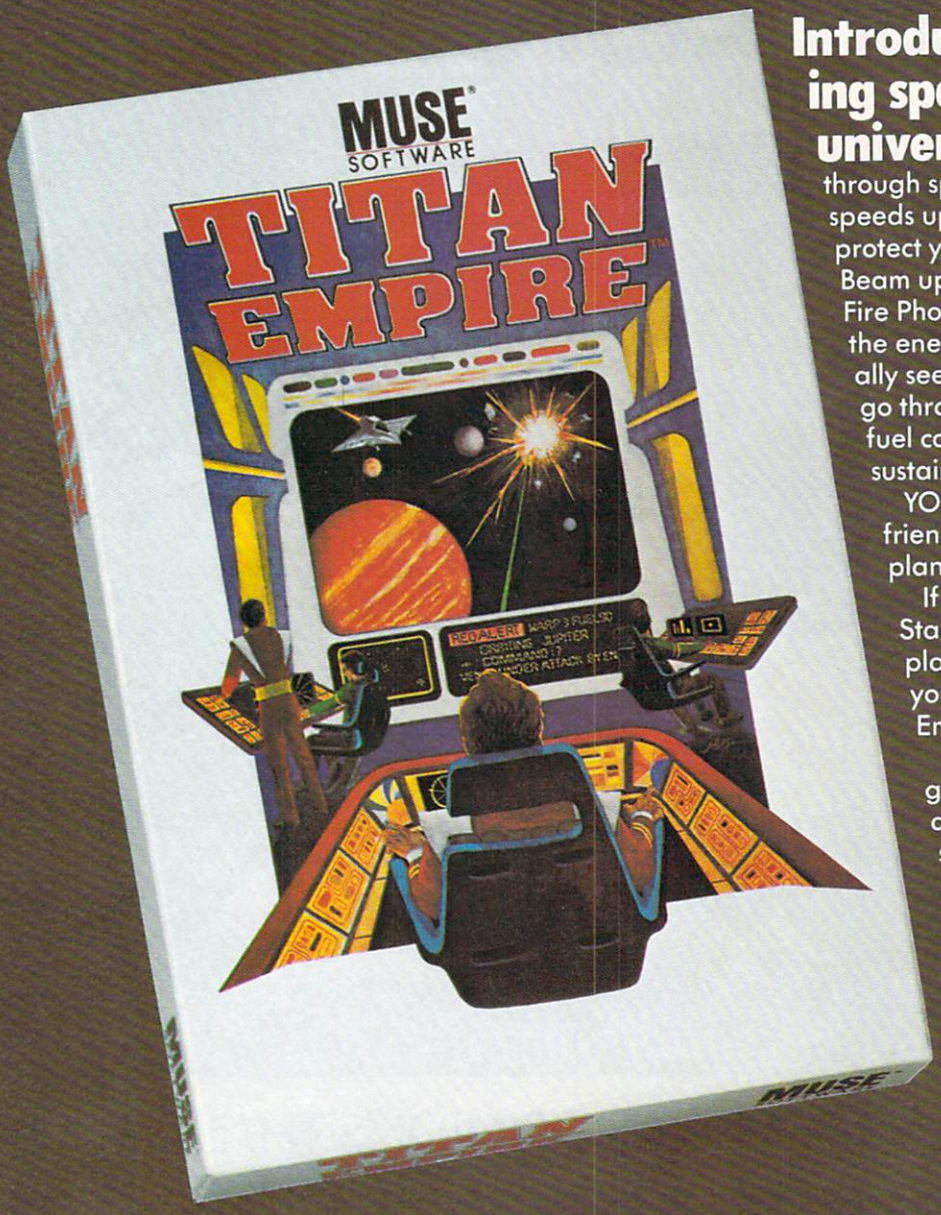

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"IT'S GREAT FUN HAVING SOMEONE LISTEN TO YOUR OPINIONS FOR A CHANGE, ESPECIALLY WHEN ADULTS ARE ALWAYS TELLING US WHAT TO DO."

Since then she's been introduced to the movers and shakers of the computer world, and she's been traveling a lot more than most high schools students: Atari brought her to the Consumer Electronics Show in Chicago earlier this year, and this fall will fly her to a special meeting to "brainstorm" with the other 19 members of the YAB, including *Diff'rent Strokes* star Todd Bridges and Matt Laborteaux, former actor in *Little House on the Prairie* and lead in the new CBS series *Whiz Kids*.

Travel isn't the only benefit of being a YAB member. Kerrie's received an Atari 1200XL to review software, and a modem, so she can telegraph her latest opinions and recommendations to other YAB members and Atari's elders. "When we say something, Atari jumps," says Kerrie.

"It's great fun having someone listen to your opinions for a change, especially when adults are always telling us what to do. Now *we* get to tell them."

Brainstorming sessions are pretty casual, says Kerrie. "Everyone just throws ideas back and forth. It's just a bunch of kids sitting around talking, while the Atari people take notes."

Certainly Atari is paying careful attention—these are not simply the offhand opinions of a bunch of teenagers. The company spends a good share of its dollars developing software, and honest, well-thought-out opinions from kids in the know can be particularly helpful in making decisions.

Kerrie may seem special to Atari, but she considers herself an average American "video jock," one of the many teenagers pumping quarters into the arcade video game machines, instead of doing homework. And she knows something about computers, too. Six years ago, she and her older brother Drew took a computer class at school—Kerrie was one of only five girls out of 20 students. She was immediately hooked. Soon enough, her music lessons and roller skating flings took a back seat to her new passion—game playing. She took another course at a local college and started to learn programming.

She doesn't think girls should avoid computers just because they don't like math or the violence of video games. "This may not seem like a ladylike attitude," she says, "but I grew up with two brothers and was always interested in what they liked," although she's quick to add, "I'm a very independent person."

Now, says Kerrie, "I always know more about computers than my boyfriends." Although she tries not to brag, she's proud. "Even the really cool guys who think they know so much try to challenge me and find they can't top me."

Kerrie was busy all year reviewing the software Atari sent every month in packages marked "Confidential." (Although Drew knew that such packages were "hands off," Kerrie still hid them.) She loves to play games—*Galaga* (not an Atari game) and *Pole Position* are her favorites, and as an advisor to Atari, she can invite her friends over to try out the new games from Atari. She played *E.T.* and *Dig Dug* before they hit the stores, reviewed the instructions for a BASIC program to determine whether they were clear, and tested the *AtariWriter* word-processing program with her family before it was released.

In addition to all this, Kerrie is designing her own game. "My adventure game will be wild, something no one has thought of yet," says the soft-spoken young woman who writes poetry and reads science fiction to goad her imagination. When she finishes the game, it will go into Atari's YAB software library, so that other teenage consultants can test it.

One day, the students at Isidore Newman High School may play that game, but Kerrie won't be walking the halls amidst their whispers. She's now a freshman at Johns Hopkins University in Baltimore, Maryland, studying computer science and math. The Atari 1200XL sits in Kerrie's dorm room, along with her stereo system and record collection. The monthly packages marked "Confidential" that Kerrie once had to hide from her brother are now kept under lock and key in the same room. She continues to review Atari software and is taking surveys to determine how college students are using their computers. She'll probably even pop into an arcade now and then—that is, if she's finished her homework.

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When Kerrie Holton and her colleagues finish their terms as Atari advisors, they'll become alumni and a new group of teenagers will take their places on the YAB. The company has already received large stacks of mail from those who want to apply for next year. If you're between the ages of 14 and 17 and are computer literate, send some information about yourself to:

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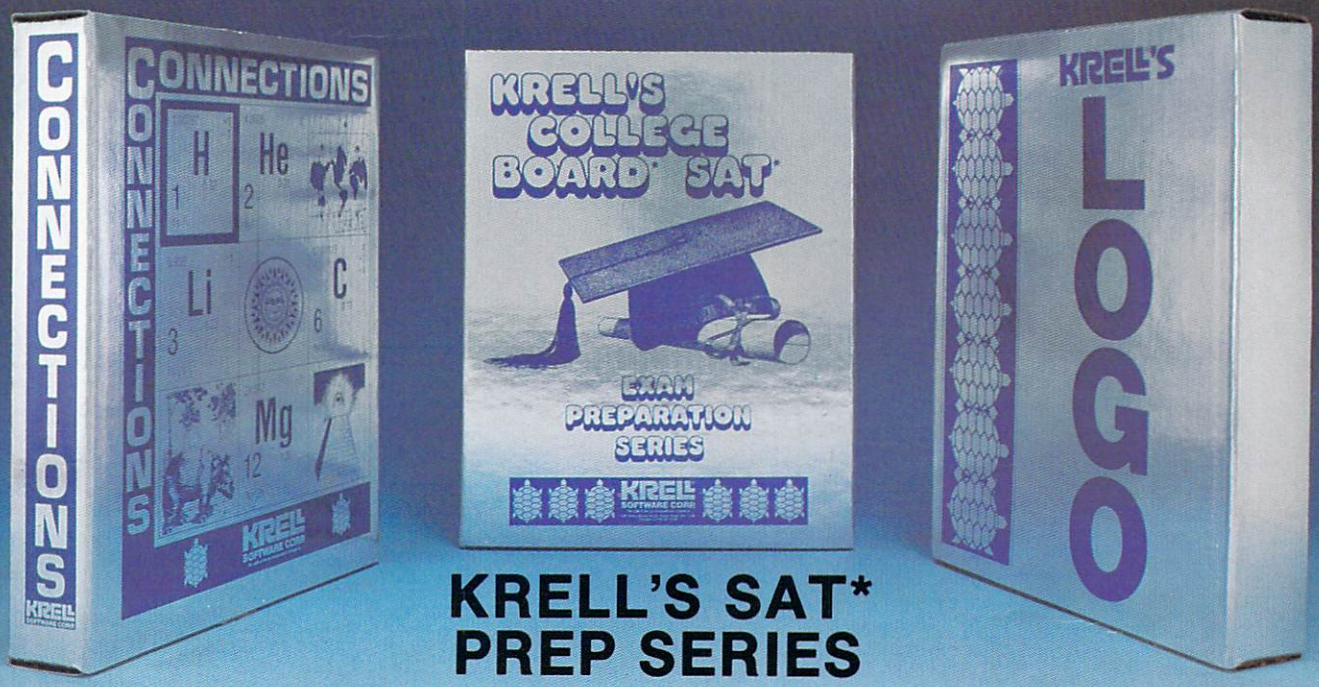

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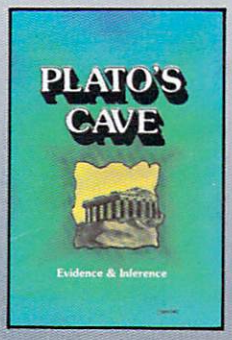

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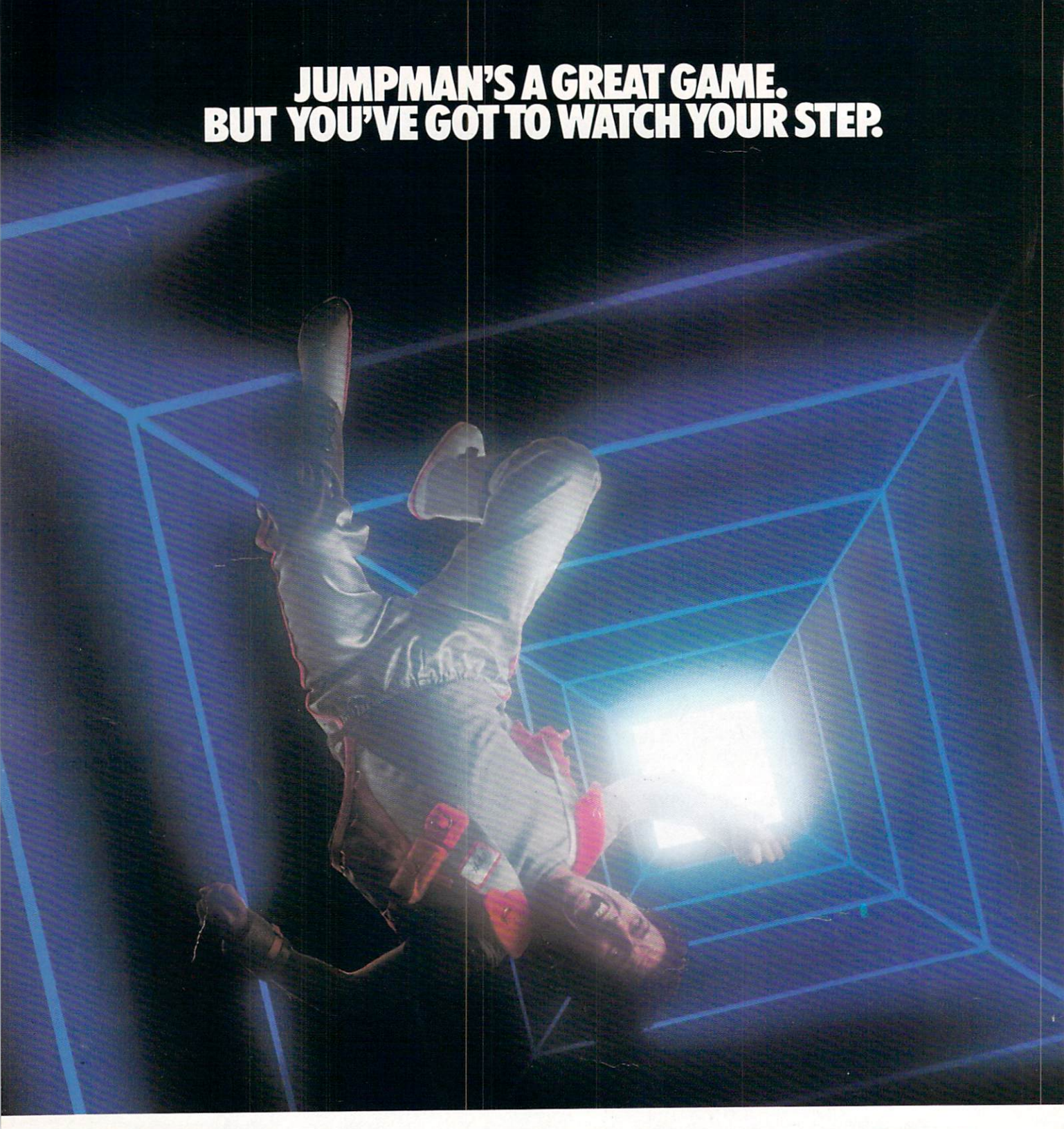

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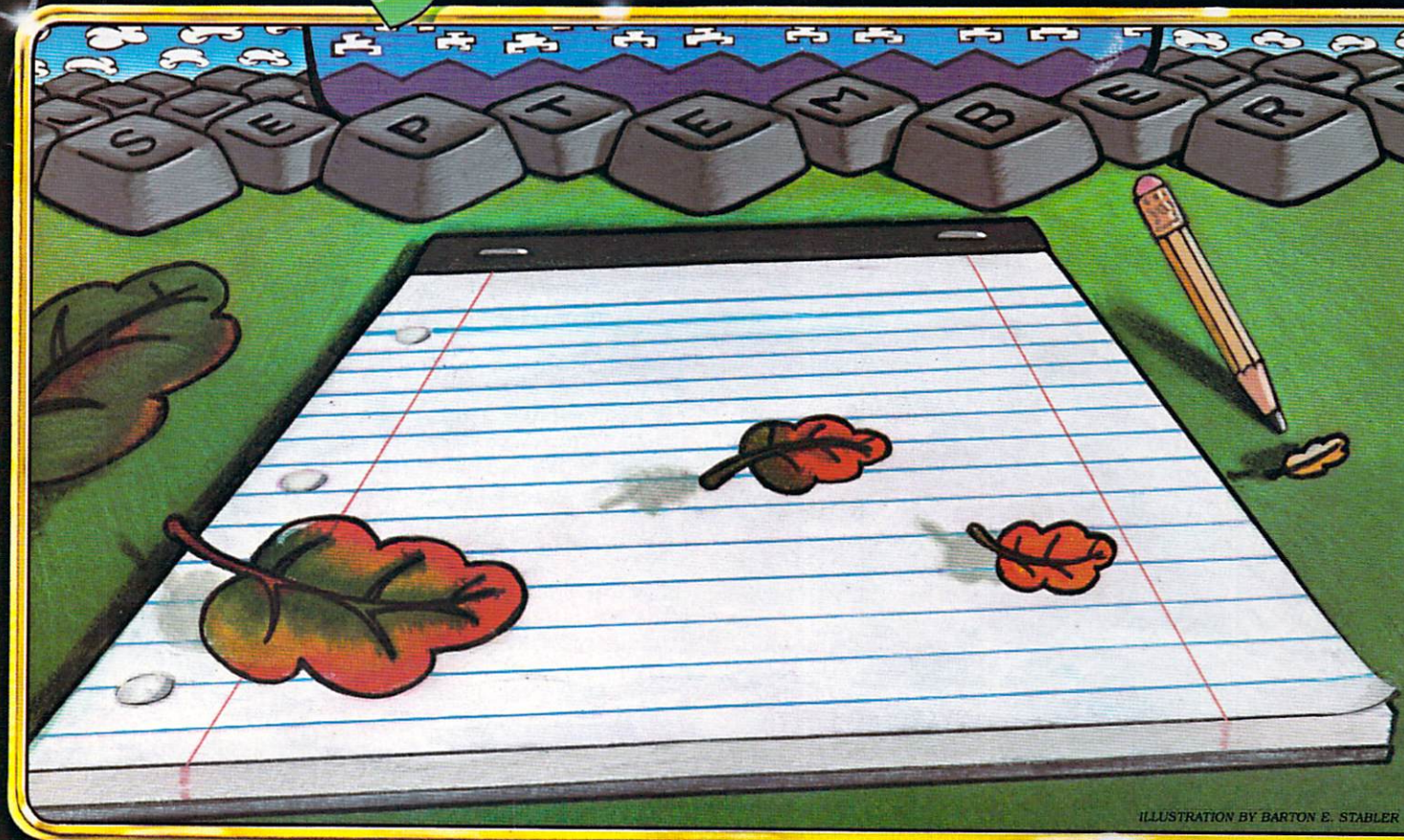


ILLUSTRATION BY BARTON E. STABLER

★ SEPTEMBER ★

BEGINNER PROGRAMS
PAGE 76 TO 81

Prepare for the new school year with these simple programs by Joey Latimer that even a beginner can master, while learning the basics of BASIC.

READER-WRITTEN PROGRAMS
PAGE 83 TO 87

Father and son use the family computer in entirely different ways in the Gustavson household in upstate New York. For programmers with practice.

PUZZLE
PAGE 82 TO 83

Ever wonder what actually goes on inside your computer? Find out while winding your way through this month's maze puzzle.

ILLUSTRATION BY JIM CHERRY III

AGING FAST While Learning BASIC

BY JOEY LATIMER

Even the simplest computer program can look quite complex to a beginner. But if you dissect it line by line, you will discover just how easy understanding a program can be.

Let's take a look at *Future Age Calculator* (on the opposite page). It is a list of step-by-step instructions that tell your computer how to figure out how old you will be in a given year.

In order to communicate with your computer, you have to talk in a language it can understand. Since each of the most popular home or personal computers understands a slightly different "dialect" of the simple language called BASIC, we've given you six slightly different versions of each program in this section.

Now take a look at the program for your machine. One of the first things you'll notice is the column of numbers on the left, called "line numbers." The line numbers tell your computer in what order you want it to execute your instructions. We've numbered the lines by tens (10, 20, 30, . . .) so that, if you want to add more lines somewhere in the middle of the program, you can do so easily without having to renumber all the following lines; but the program would work just as well if you numbered the lines 100, 200, 300, . . . or even 2, 27, 81. . . . Following each line number is a command: a word or words in the BASIC language that tell the computer to perform an operation (input a number, print a sentence, etc.).

Line 20 tells the computer to clear the screen and return the cursor to its home base, usually the upper left-hand corner of the screen. Although all dialects of BASIC have approximately the same "vocabulary" of commands, there are some variations; in particular, commands used for clearing the screen differ markedly, from HOME, CLS, and CALL CLEAR to CHR$(147) and CHR$(125). Also, Atari BASIC requires an additional line, "10 DIM P$(1)", which tells the computer how much space to reserve for the string variable P$; other computers automatically set aside space for strings. See the explanation of line 250, below.

Line 30 instructs the computer to print on your screen whatever is in quotation marks.

In all but the Timex Sinclair version, lines 40 and 50 contain the two commands FOR and NEXT, which form what is called a FOR . . . NEXT loop. Let's see what they're doing in this program.

X is a *variable.* (A variable is simply a name representing a storage place in the computer's memory that can have values assigned to it.) When the computer first reaches line 40, "FOR X = 1 TO 1000", it gives the variable X the value 1. Then it goes down to line 50 and is told to proceed to the "NEXT X". This is a signal to return to the preceding FOR statement (line 40) and give X its next value, in this case 2. This process is repeated until the value of X has reached 1000. Then, the computer passes through the "NEXT X" statement and down to line 60.

This process keeps the computer busy so that the title remains on the screen for several seconds.

The Timex Sinclair has a command designed specifically to produce a delay: PAUSE X, where X equals the number of seconds you wish to pause multiplied by 60. Thus, PAUSE 300 causes a five-second delay.

In line 90 the computer is instructed to print nothing and move on to the next line. The effect is similar to double-spacing on your typewriter.

The command INPUT Y in line 110 allows you to type the current year into the computer and assigns that value to the variable Y.

When a PRINT command ends with a semicolon (*outside* the quotation marks), the computer does *not* automatically go down to the next line as it normally would. Now, in most dialects of BASIC an INPUT command (as in line 110) automatically causes a question mark to appear on the screen. Because line 100 ends with a semicolon (in all but the Timex version) line 110 causes the question mark to appear on the same line as the question "WHAT YEAR IS IT".

In line 200 the computer prints the message between the quotes, sees the semicolon and does not skip to the next line, and then encounters the variable F. Since there are no quotation marks around F, the computer does not print the letter "F" but rather the *value* of the variable F, which is the future year for which you want to see your age.

Similarly, when executing line 210 the computer first prints the words in quotes, then figures out the value of the mathematical expression that is not in quotes ((F - Y) + A), prints that value, and finally prints what appears between the final set of quotes (a period).

The parentheses ("(" and ")") around F - Y tell the computer to do the subtraction first and then the addition. So the value of (F - Y) + A turns out to be your age in the desired future year: the current year (Y) is subtracted from the future year (F), and then your present age (A) is added to the difference.

The Timex program then stops. In the others, line 250 keeps everything on the screen until further input from you. Remember that in lines 110, 140, and 180 you had to input a number into the variables Y, A, and F before you pressed RETURN or ENTER. The advantage of adding a $ to the variable P to make it the string variable P$ (pronounced "P-string") is that it allows you to input *nothing* (or any string of letters, numbers, and/or special characters) before pressing the RETURN or ENTER key. Execution then proceeds with the next line.

Finally, line 260 instructs the computer to go back to line 20 and start over again. The computer will execute the program over and over again in what is called an "endless loop" until you stop it (by pressing BREAK, CTRL and RESET, or RUN/STOP and RESTORE, depending on which computer you have).

JOEY LATIMER *is a contributing editor to* FAMILY COMPUTING, *and an instructor at the Creative Computer Learning Center in San Marino, California.*

Apple/Future Age Calculator

```
20  HOME
30  PRINT "FUTURE AGE CALCULATOR"
40  FOR X = 1 TO 1000
50  NEXT X
60  HOME
70  PRINT "TYPE THE CORRECT ANSWER;"
80  PRINT "THEN PRESS THE RETURN KEY."
90  PRINT
100  PRINT "WHAT YEAR IS IT";
110  INPUT Y
120  PRINT
130  PRINT "HOW OLD ARE YOU";
140  INPUT A
150  PRINT
160  PRINT "FOR WHAT FUTURE YEAR DO"
170  PRINT "YOU WANT TO SEE YOUR AGE";
180  INPUT F
190  HOME
200  PRINT "ON THIS DAY IN ";F
210  PRINT "YOU WILL BE ";(F - Y) + A;"."
220  PRINT
230  PRINT "PRESS THE RETURN KEY"
240  PRINT "TO PLAY AGAIN!"
250  INPUT P$
260  GOTO 20
```

Atari/Future Age Calculator

```
10 DIM P$(1)
20 PRINT CHR$(125)
30 PRINT "FUTURE AGE CALCULATOR"
40 FOR X=1 TO 1000
50 NEXT X
60 PRINT CHR$(125)
70 PRINT "TYPE THE CORRECT ANSWER;"
80 PRINT "THEN PRESS THE RETURN KEY."
90 PRINT
100 PRINT "WHAT YEAR IS IT";
110 INPUT Y
120 PRINT
130 PRINT "HOW OLD ARE YOU";
140 INPUT A
150 PRINT
160 PRINT "FOR WHAT FUTURE YEAR DO"
170 PRINT "YOU WANT TO SEE YOUR AGE";
180 INPUT F
190 PRINT CHR$(125)
200 PRINT "ON THIS DAY IN ";F
210 PRINT "YOU WILL BE ";(F-Y)+A;"."
220 PRINT
230 PRINT "PRESS THE RETURN KEY"
240 PRINT "TO PLAY AGAIN!"
250 INPUT P$
260 GOTO 20
```

TI-99/4A/Future Age Calculator

```
20 CALL CLEAR
30 PRINT "FUTURE AGE CALCULATOR"
40 FOR X=1 TO 1000
50 NEXT X
60 CALL CLEAR
70 PRINT "TYPE THE CORRECT ANSWER;"
80 PRINT "THEN PRESS THE ENTER KEY."
90 PRINT
100 PRINT "WHAT YEAR IS IT";
110 INPUT Y
120 PRINT
130 PRINT "HOW OLD ARE YOU";
140 INPUT A
150 PRINT
160 PRINT "FOR WHAT FUTURE YEAR DO"
170 PRINT "YOU WANT TO SEE YOUR AGE";
180 INPUT F
190 CALL CLEAR
200 PRINT "ON THIS DAY IN ";F
210 PRINT "YOU WILL BE ";(F-Y)+A;"."
220 PRINT
230 PRINT "PRESS THE ENTER KEY"
240 PRINT "TO PLAY AGAIN!"
250 INPUT P$
260 GOTO 20
```

Timex Sinclair 1000/Future Age Calculator

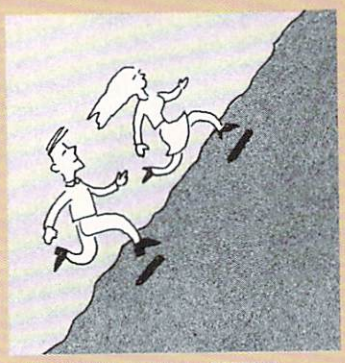
```
 20 CLS
 30 PRINT "FUTURE AGE CALCULATOR"
 40 PAUSE 300
 60 CLS
 70 PRINT "TYPE THE CORRECT ANSWER;"
 80 PRINT "THEN PRESS THE ENTER KEY."
 90 PRINT
100 PRINT "WHAT YEAR IS IT?"
110 INPUT Y
120 PRINT
130 PRINT "HOW OLD ARE YOU?"
140 INPUT A
150 PRINT
160 PRINT "FOR WHAT FUTURE YEAR DO"
170 PRINT "YOU WANT TO SEE YOUR AGE?"
180 INPUT F
190 CLS
200 PRINT "ON THIS DAY IN ";F
210 PRINT "YOU WILL BE ";(F-Y)+A;"."
260 STOP
```

TRS-80s & IBM-PC/Future Age Calculator

```
20 CLS
30 PRINT "FUTURE AGE CALCULATOR"
40 FOR X = 1 TO 1000
50 NEXT X
60 CLS
70 PRINT "TYPE THE CORRECT ANSWER;"
80 PRINT "THEN PRESS THE ENTER KEY."
90 PRINT
100 PRINT "WHAT YEAR IS IT";
110 INPUT Y
120 PRINT
130 PRINT "HOW OLD ARE YOU";
140 INPUT A
150 PRINT
160 PRINT "FOR WHAT FUTURE YEAR DO"
170 PRINT "YOU WANT TO SEE YOUR AGE";
180 INPUT F
190 CLS
200 PRINT "ON THIS DAY IN ";F
210 PRINT "YOU WILL BE ";(F-Y)+A;"."
220 PRINT
230 PRINT "PRESS THE ENTER KEY"
240 PRINT "TO PLAY AGAIN!"
250 INPUT P$
260 GOTO 20
```

RAD RHYMER

Rad Rhymer allows you (and your best friend) to become the stars of a famous nursery rhyme. Simply type in the program, run it, and sit back and chuckle over your own misfortunes. (By the way, in California, where the author lives, "rad" is short for "radical.")



ILLUSTRATIONS BY JOSHUA GOSFIELD

Apple/Rad Rhymer

```
20  HOME
30  PRINT "RAD RHYMER"
40  FOR T = 1 TO 1000
50  NEXT T
60  HOME
70  PRINT "ANSWER THE QUESTION;"
80  PRINT "THEN PRESS THE RETURN KEY."
90  PRINT
100  PRINT "WHAT IS YOUR NAME";
110  INPUT N$
120  PRINT
130  PRINT "WHAT IS THE NAME OF"
140  PRINT "YOUR BEST FRIEND";
150  INPUT F$
160  PRINT
170  PRINT "ARE YOU MALE OR FEMALE";
180  INPUT M$
190  IF M$ = "MALE" OR M$ = "M" THEN G$ = "HI
S"
200  IF G$ = "HIS" THEN 260
210  IF M$ = "FEMALE" OR M$ = "F" THEN G$ = "
HER"
220  IF G$ = "HER" THEN 260
230  GOTO 160
260  PRINT
270  PRINT "WHAT IS YOUR FAVORITE DRINK";
280  INPUT D$
290  PRINT
300  PRINT "WHAT IS THE NAME"
310  PRINT "OF ONE PART OF YOUR BODY";
320  INPUT B$
330  PRINT
340  PRINT "PRESS THE RETURN KEY"
350  PRINT "TO SEE THE RAD RHYME."
360  INPUT S$
370  HOME
380  PRINT N$" AND "F$
390  PRINT "WENT UP THE HILL"
400  PRINT "TO FETCH A PAIL OF "D$"."
410  PRINT N$" FELL DOWN AND"
420  PRINT "BROKE "G$" "B$","
430  PRINT "AND "F$" CAME"
440  PRINT "TUMBLING AFTER."
```

Atari/Rad Rhymer

```
10 DIM N$(25),F$(25),M$(7),G$(3),D$(25),B$(25
),S$(1)
20 PRINT CHR$(125)
30 PRINT "RAD RHYMER"
40 FOR T=1 TO 1000
50 NEXT T
60 PRINT CHR$(125)
70 PRINT "ANSWER THE QUESTION;"
80 PRINT "THEN PRESS THE RETURN KEY."
90 PRINT
100 PRINT "WHAT IS YOUR NAME";
110 INPUT N$
120 PRINT
130 PRINT "WHAT IS THE NAME OF"
140 PRINT "YOUR BEST FRIEND";
150 INPUT F$
160 PRINT
170 PRINT "ARE YOU MALE OR FEMALE";
180 INPUT M$
190 IF M$="MALE" OR M$="M" THEN G$="HIS"
200 IF G$="HIS" THEN 260
210 IF M$="FEMALE" OR M$="F" THEN G$="HER"
220 IF G$="HER" THEN 260
230 GOTO 160
260 PRINT
270 PRINT "WHAT IS YOUR FAVORITE DRINK";
280 INPUT D$
290 PRINT
300 PRINT "WHAT IS THE NAME"
310 PRINT "OF ONE PART OF YOUR BODY";
320 INPUT B$
330 PRINT
340 PRINT "PRESS THE RETURN KEY"
350 PRINT "TO SEE THE RAD RHYME."
360 INPUT S$
370 PRINT CHR$(125)
380 PRINT N$;" AND ";F$
390 PRINT "WENT UP THE HILL"
400 PRINT "TO FETCH A PAIL OF ";D$;"."
410 PRINT N$;" FELL DOWN AND"
420 PRINT "BROKE ";G$;" ";B$;","
430 PRINT "AND ";F$;" CAME"
440 PRINT "TUMBLING AFTER."
```

Commodore 64 & VIC-20/Rad Rhymer

```
20 PRINT CHR$(147)
30 PRINT "RAD RHYMER"
40 FOR T=1 TO 1000
50 NEXT T
60 PRINT CHR$(147)
70 PRINT "ANSWER THE QUESTION;"
80 PRINT "THEN PRESS THE RETURN KEY."
90 PRINT
100 PRINT "WHAT IS YOUR NAME"
110 INPUT N$
120 PRINT
130 PRINT "WHAT IS THE NAME OF"
140 PRINT "YOUR BEST FRIEND"
150 INPUT F$
160 PRINT
170 PRINT "ARE YOU MALE OR FEMALE"
180 INPUT M$
190 IF M$="MALE" OR M$="M" THEN G$="HIS"
200 IF G$="HIS" THEN 260
210 IF M$="FEMALE" OR M$="F" THEN G$="HER"
```

TI-99/4A/Rad Rhymer

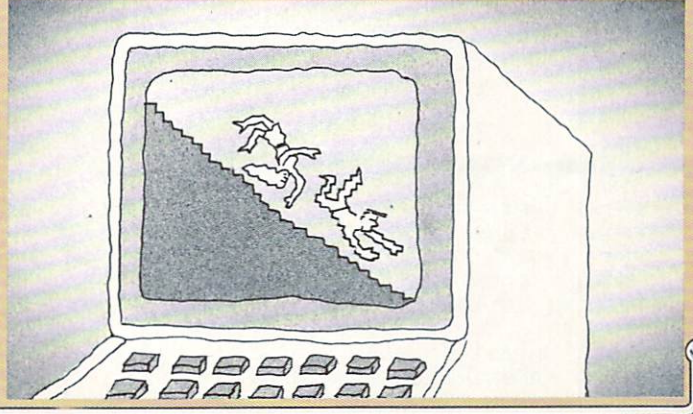
```
20 CALL CLEAR
30 PRINT "RAD RHYMER"
40 FOR T=1 TO 1000
50 NEXT T
60 CALL CLEAR
70 PRINT "ANSWER THE QUESTION;"
80 PRINT "THEN PRESS THE ENTER KEY."
90 PRINT
100 PRINT "WHAT IS YOUR NAME";
110 INPUT N$
120 PRINT
130 PRINT "WHAT IS THE NAME OF"
140 PRINT "YOUR BEST FRIEND";
150 INPUT F$
160 PRINT
170 PRINT "ARE YOU MALE OR FEMALE";
180 INPUT M$
190 IF M$="MALE" THEN 210
200 IF M$="M" THEN 210 ELSE 230
210 G$="HIS"
220 GOTO 260
230 IF M$="FEMALE" THEN 250
240 IF M$="F" THEN 250 ELSE 160
250 G$="HER"
260 PRINT
270 PRINT "WHAT IS YOUR FAVORITE DRINK";
280 INPUT D$
290 PRINT
300 PRINT "WHAT IS THE NAME"
310 PRINT "OF ONE PART OF YOUR BODY";
320 INPUT B$
330 PRINT
340 PRINT "PRESS THE ENTER KEY"
350 PRINT "TO SEE THE RAD RHYME."
360 INPUT S$
370 CALL CLEAR
380 PRINT N$;" AND ";F$
390 PRINT "WENT UP THE HILL"
400 PRINT "TO FETCH A PAIL OF ";D$;"."
410 PRINT N$;" FELL DOWN AND"
420 PRINT "BROKE ";G$;" ";B$;","
430 PRINT "AND ";F$;" CAME"
440 PRINT "TUMBLING AFTER."
```

Timex Sinclair 1000/Rad Rhymer

```
 10 LET G$=" "
 20 CLS
 30 PRINT "RAD RHYMER"
 40 PAUSE 200
 60 CLS
 70 PRINT "ANSWER THE QUESTION;"
 80 PRINT "THEN PRESS THE ENTER KEY."
 90 PRINT
100 PRINT "WHAT IS YOUR NAME?"
110 INPUT N$
120 PRINT
130 PRINT "WHAT IS THE NAME OF"
140 PRINT "YOUR BEST FRIEND?"
150 INPUT F$
160 PRINT
170 PRINT "ARE YOU MALE OR FEMALE?"
180 INPUT M$
190 IF M$="MALE" OR M$="M" THEN LET G$="HIS"
200 IF G$="HIS" THEN GOTO 260
210 IF M$="FEMALE" OR M$="F" THEN LET G$="HER"
220 IF G$="HER" THEN GOTO 260
230 GOTO 160
260 PRINT
270 PRINT "WHAT IS YOUR FAVORITE DRINK?"
280 INPUT D$
290 PRINT
300 PRINT "WHAT IS THE NAME"
310 PRINT "OF ONE PART OF YOUR BODY?"
320 INPUT B$
330 PRINT
340 PRINT "PRESS THE ENTER KEY"
350 PRINT "TO SEE THE RAD RHYME."
360 INPUT S$
370 CLS
380 PRINT N$;" AND ";F$
390 PRINT "WENT UP THE HILL"
400 PRINT "TO FETCH A PAIL OF ";D$;"."
410 PRINT N$;" FELL DOWN AND"
420 PRINT "BROKE ";G$;" ";B$;","
430 PRINT "AND ";F$;" CAME"
440 PRINT "TUMBLING AFTER."
```

TRS-80s & IBM-PC/Rad Rhymer

```
20 CLS
30 PRINT "RAD RHYMER"
40 FOR T=1 TO 1000
50 NEXT T
60 CLS
70 PRINT "ANSWER THE QUESTION;"
80 PRINT "THEN PRESS THE ENTER KEY."
90 PRINT
100 PRINT "WHAT IS YOUR NAME";
110 INPUT N$
120 PRINT
130 PRINT "WHAT IS THE NAME OF"
140 PRINT "YOUR BEST FRIEND";
150 INPUT F$
160 PRINT
170 PRINT "ARE YOU MALE OR FEMALE";
180 INPUT M$
190 IF M$="MALE" OR M$="M" THEN G$="HIS"
200 IF G$="HIS" THEN 260
210 IF M$="FEMALE" OR M$="F" THEN G$="HER"
220 IF G$="HER" THEN 260
230 GOTO 160
260 PRINT
270 PRINT "WHAT IS YOUR FAVORITE DRINK";
280 INPUT D$
290 PRINT
300 PRINT "WHAT IS THE NAME"
310 PRINT "OF ONE PART OF YOUR BODY";
320 INPUT B$
330 PRINT
340 PRINT "PRESS THE ENTER KEY"
350 PRINT "TO SEE THE RAD RHYME."
360 INPUT S$
370 CLS
380 PRINT N$" AND "F$
390 PRINT "WENT UP THE HILL"
400 PRINT "TO FETCH A PAIL OF "D$"."
410 PRINT N$" FELL DOWN AND"
420 PRINT "BROKE "G$" "B$","
430 PRINT "AND "F$" CAME"
440 PRINT "TUMBLING AFTER."
```



LEARN NAMES QUICKER!

Has the third week of school gone by and you *still* haven't learned the name of that kid behind you with the curly hair? Now you can use your computer to help you *Learn Names Quicker*! Simply type in this program and run it. [You might want to help the memorization process by adding a distinguishing quality after each person's name, such as: John Doe (curly hair).]

Apple/Learn Names Quicker!

```
10  DIM C$(60)
20  HOME
30  CLEAR
40  PRINT "LEARN NAMES QUICKER!"
50  FOR T = 1 TO 1000
60  NEXT T
70  HOME
80  PRINT "ANSWER THE QUESTION;"
90  PRINT "THEN PRESS THE RETURN KEY."
100  PRINT
110  PRINT "HOW MANY KIDS ARE THERE"
120  PRINT "IN YOUR CLASS";
130  INPUT K
140  HOME
150  PRINT "TYPE IN THE NAMES."
160  PRINT
170  PRINT "PRESS THE RETURN KEY"
180  PRINT "AFTER EACH NAME."
190  FOR X = 1 TO K
200  INPUT C$(X)
210  NEXT X
220  HOME
230  PRINT "PRESS THE RETURN KEY"
240  PRINT "TO SEE A LIST OF"
250  PRINT "EVERYONE IN YOUR CLASS."
260  INPUT L$
270  HOME
280  FOR X = 1 TO K
290  PRINT C$(X)
300  FOR T = 1 TO 500
310  NEXT T
320  NEXT X
330  FOR T = 1 TO 1000
340  NEXT T
350  PRINT
360  PRINT "PRESS 1 TO SEE THE LIST AGAIN OR"
370  PRINT "PRESS 2 TO START A NEW LIST;"
380  PRINT "THEN PRESS THE RETURN KEY."
390  INPUT N
400  IF N = 1 THEN 270
410  IF N = 2 THEN 20
420  END
```

Atari/Learn Names Quicker!

```
10 DIM C$(1200),L$(1),TEMP$(20)
20 PRINT CHR$(125)
30 PRINT "PLEASE WAIT...":FOR I=1 TO 1200:C$(
I,I)=" ":NEXT I:PRINT CHR$(125)
40 PRINT "LEARN NAMES QUICKER!"
50 FOR T=1 TO 1000
60 NEXT T
70 PRINT CHR$(125)
80 PRINT "ANSWER THE QUESTION;"
90 PRINT "THEN PRESS THE RETURN KEY."
100 PRINT
110 PRINT "HOW MANY KIDS ARE THERE"
120 PRINT "IN YOUR CLASS";
130 INPUT K
140 PRINT CHR$(125)
150 PRINT "TYPE IN THE NAMES."
160 PRINT
170 PRINT "PRESS THE RETURN KEY"
180 PRINT "AFTER EACH NAME."
190 FOR X=1 TO K
200 INPUT TEMP$:C$(20*X-19,20*X)=TEMP$
210 NEXT X
220 PRINT CHR$(125)
230 PRINT "PRESS THE RETURN KEY"
240 PRINT "TO SEE A LIST OF"
250 PRINT "EVERYONE IN YOUR CLASS."
260 INPUT L$
270 PRINT CHR$(125)
280 FOR X=1 TO K
290 PRINT C$(20*X-19,20*X)
300 FOR T=1 TO 300
310 NEXT T
320 NEXT X
330 FOR T=1 TO 700
340 NEXT T
350 PRINT
360 PRINT "PRESS 1 TO SEE THE LIST AGAIN OR"
370 PRINT "PRESS 2 TO START A NEW LIST;"
380 PRINT "THEN PRESS THE RETURN KEY."
390 INPUT N
400 IF N=1 THEN 270
410 IF N=2 THEN 20
420 END
```

Commodore 64 & VIC-20/Learn Names Quicker!

```
10 DIM C$(60)
20 PRINT CHR$(147)
40 PRINT "LEARN NAMES QUICKER!"
50 FOR T=1 TO 1000
60 NEXT T
70 PRINT CHR$(147)
80 PRINT "ANSWER THE QUESTION;"
90 PRINT "THEN PRESS THE RETURN KEY."
100 PRINT
110 PRINT "HOW MANY KIDS ARE THERE"
120 PRINT "IN YOUR CLASS";
130 INPUT K
140 PRINT CHR$(147)
150 PRINT "TYPE IN THE NAMES."
160 PRINT
170 PRINT "PRESS THE RETURN KEY"
180 PRINT "AFTER EACH NAME."
190 FOR X=1 TO K
200 INPUT C$(X)
210 NEXT X
220 PRINT CHR$(147)
230 PRINT "PRESS THE RETURN KEY"
240 PRINT "TO SEE A LIST OF"
250 PRINT "EVERYONE IN YOUR CLASS."
260 INPUT L$
270 PRINT CHR$(147)
280 FOR X=1 TO K
290 PRINT C$(X)
300 FOR T=1 TO 500
310 NEXT T
320 NEXT X
330 FOR T=1 TO 1000
340 NEXT T
350 PRINT
360 PRINT "PRESS 1 TO SEE THE LIST AGAIN OR"
370 PRINT "PRESS 2 TO START A NEW LIST;"
380 PRINT "THEN PRESS THE RETURN KEY."
390 INPUT N
400 IF N=1 THEN 270
410 IF N=2 THEN 20
```

TI-99/4A/Learn Names Quicker!

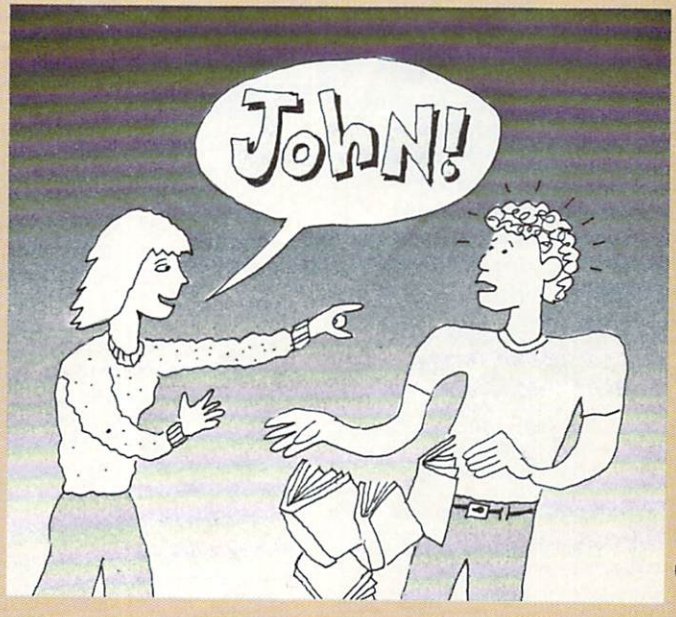
```
10 DIM C$(60)
20 CALL CLEAR
40 PRINT "LEARN NAMES QUICKER!"
50 FOR T=1 TO 1000
60 NEXT T
70 CALL CLEAR
80 PRINT "ANSWER THE QUESTION;"
90 PRINT "THEN PRESS THE ENTER KEY."
100 PRINT
110 PRINT "HOW MANY KIDS ARE THERE"
120 PRINT "IN YOUR CLASS";
130 INPUT K
140 CALL CLEAR
150 PRINT "TYPE IN THE NAMES."
160 PRINT
170 PRINT "PRESS THE ENTER KEY"
180 PRINT "AFTER EACH NAME."
190 FOR X=1 TO K
200 INPUT C$(X)
210 NEXT X
220 CALL CLEAR
230 PRINT "PRESS THE ENTER KEY"
240 PRINT "TO SEE A LIST OF"
250 PRINT "EVERYONE IN YOUR CLASS."
260 INPUT L$
270 CALL CLEAR
280 FOR X=1 TO K
290 PRINT C$(X)
300 FOR T=1 TO 500
310 NEXT T
320 NEXT X
330 FOR T=1 TO 1000
340 NEXT T
350 PRINT
360 PRINT "PRESS 1 TO SEE LIST AGAIN OR"
370 PRINT "PRESS 2 TO START A NEW LIST;"
380 PRINT "THEN PRESS THE ENTER KEY."
390 INPUT N
400 IF N=1 THEN 270
410 IF N=2 THEN 20
420 END
```

Timex Sinclair 1000/Learn Names Quicker!

```
 10 DIM C$(40,20)
 20 CLS
 40 PRINT "LEARN NAMES QUICKER"
 50 PAUSE 200
 70 CLS
 80 PRINT "ANSWER THE QUESTION;"
 90 PRINT "THEN PRESS THE ENTER KEY."
100 PRINT
110 PRINT "HOW MANY KIDS ARE THERE"
120 PRINT "IN YOUR CLASS?"
130 INPUT K
140 CLS
150 PRINT "TYPE IN THE NAMES."
160 PRINT
170 PRINT "PRESS THE ENTER KEY"
180 PRINT "AFTER EACH NAME."
190 FOR X=1 TO K
200 INPUT C$(X)
210 NEXT X
220 CLS
230 PRINT "PRESS THE ENTER KEY"
240 PRINT "TO SEE A LIST OF"
250 PRINT "EVERYONE IN YOUR CLASS."
260 INPUT L$
270 CLS
280 FOR X=1 TO K
290 PRINT C$(X)
300 PAUSE 30
320 NEXT X
330 PAUSE 60
350 PRINT
360 PRINT "PRESS 1 TO SEE THE LIST AGAIN OR"
370 PRINT "PRESS 2 TO START A NEW LIST;"
380 PRINT "THEN PRESS THE ENTER KEY."
390 INPUT N
400 IF N=1 THEN GOTO 270
410 IF N=2 THEN GOTO 20
420 STOP
```

TRS-80s & IBM-PC/Learn Names Quicker!

```
10 DIM C$(60)
20 CLS
30 CLEAR 1000
40 PRINT "LEARN NAMES QUICKER!"
50 FOR T=1 TO 1000
60 NEXT T
70 CLS
80 PRINT "ANSWER THE QUESTION;"
90 PRINT "THEN PRESS THE ENTER KEY."
100 PRINT
110 PRINT "HOW MANY KIDS ARE THERE"
120 PRINT "IN YOUR CLASS";
130 INPUT K
140 CLS
150 PRINT "TYPE IN THE NAMES."
160 PRINT
170 PRINT "PRESS THE ENTER KEY"
180 PRINT "AFTER EACH NAME."
190 FOR X=1 TO K
200 INPUT C$(X)
210 NEXT X
220 CLS
230 PRINT "PRESS THE ENTER KEY"
240 PRINT "TO SEE A LIST OF"
250 PRINT "EVERYONE IN YOUR CLASS."
260 INPUT L$
270 CLS
280 FOR X=1 TO K
290 PRINT C$(X)
300 FOR T=1 TO 500
310 NEXT T
320 NEXT X
330 FOR T=1 TO 1000
340 NEXT T
350 PRINT
360 PRINT "PRESS 1 TO SEE THE LIST AGAIN OR"
370 PRINT "PRESS 2 TO START A NEW LIST;"
380 PRINT "THEN PRESS THE ENTER KEY."
390 INPUT N
400 IF N=1 THEN 270
410 IF N=2 THEN 20
420 END
```

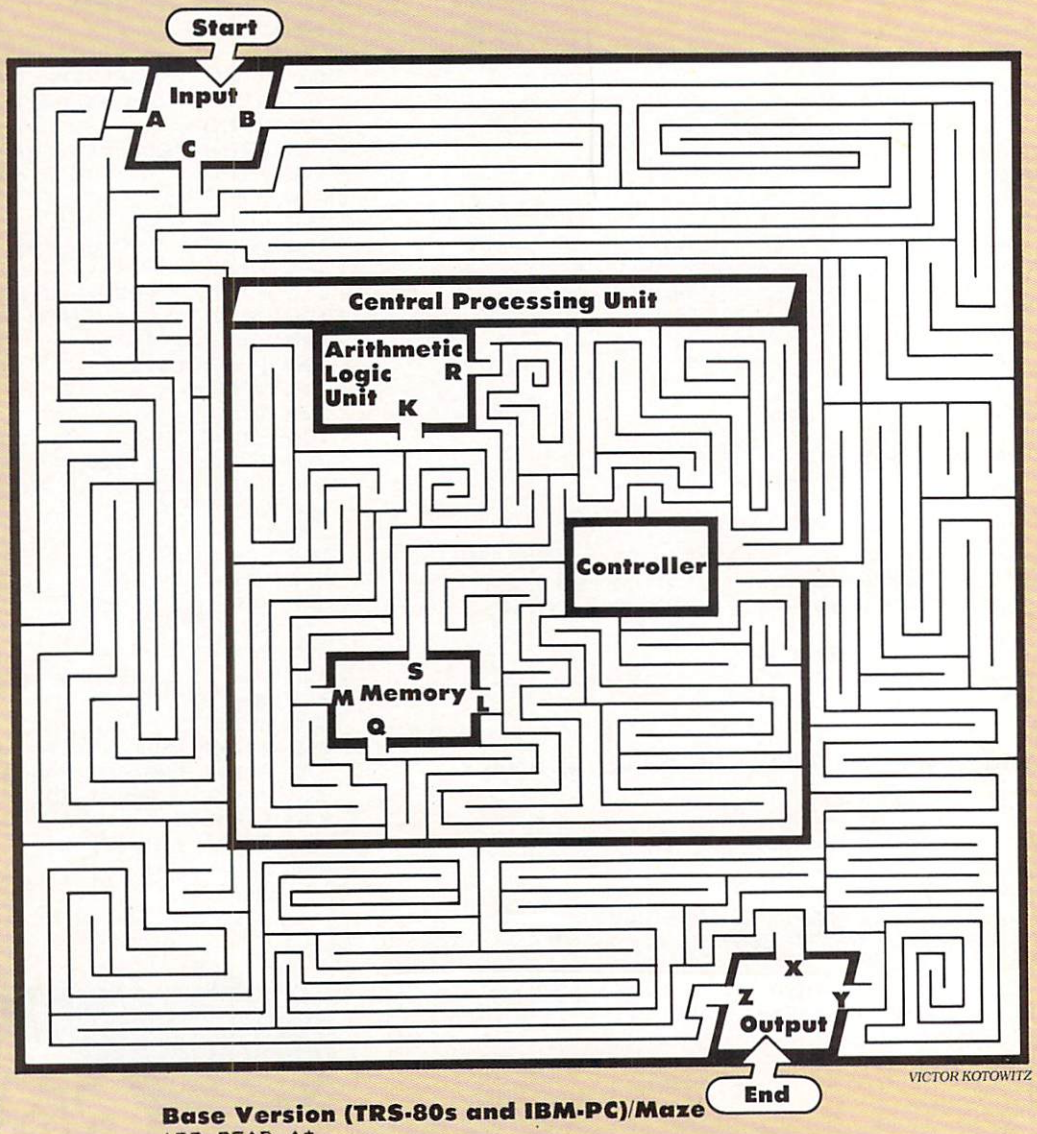


HAVE IT YOUR WAY
Program or Pencil Your Way Through This Maze

BY STEPHEN McMANUS

Have you ever wondered what actually happens inside a computer? How does a computer perform the simplest calculation, like adding 1 and 5 together to get 6? Follow the pathways of this maze, and you will be tracing the path of data as it is processed in a computer.

The hub of all the computer's activities is the *Central Processing Unit* (CPU). Located in the CPU is the *controller*, the "brains" of the whole operation, which determines what happens within the computer from moment to moment. Let's say you've programmed your computer to perform and display or print the results of simple addition problems, and have typed in the numbers 1 and 5 to be added together. The controller takes the data (1 and 5) from your *input* device (your computer's keyboard) and stores them in *memory*. The controller then copies the data from memory into the *Arithmetic Logic Unit* (ALU). At the direction of the controller, the ALU does the actual processing of data—all calculations and comparisons. It adds the 1 and 5, and then the controller copies the result, 6, back into a location in memory. Next, the controller copies the result from memory onto whatever *output* device you have: monitor, printer, etc. *continued*



VICTOR KOTOWITZ

Base Version (TRS-80s and IBM-PC)/Maze

```
100 READ A$
110 H = 0: READ E, B$
130 CLS: PRINT: PRINT
140 PRINT "MOVE FROM ";A$;" TO ";B$: PRINT
160 IF H = 1 THEN PRINT "USE EXIT MARKED "; CHR$(E)
170 PRINT: PRINT
190 IF H = 0 THEN PRINT "PRESS 'H' FOR HELP OR"
200 PRINT "PRESS 'N' FOR NEXT DESTINATION;"
210 PRINT "THEN PRESS THE ENTER KEY."
220 INPUT R$
230 IF R$ < > "H" AND R$ < > "N" THEN 130
250 IF R$ = "H" THEN H = 1: GOTO 130
280 IF B$ = "OUTPUT" THEN 310
290 A$ = B$: GOTO 110
310 CLS: PRINT: PRINT
320 PRINT "YOU DID IT ALL!": PRINT
330 END
340 DATA INPUT,66,MEMORY,77
350 DATA THE ALU,75,MEMORY,76,OUTPUT
```

STEPHEN McMANUS *is a free-lance recording engineer living in Los Angeles. He has worked with numerous musicians, including Toto, Elton John, and Bette Midler. He recently sold his motorcycle to buy a VIC-20.*

Let's see if you can perform the controller's job in our computer maze by drawing a continuous line from input to output, representing the flow of data through a computer. Remember: You must not cross over any of the lines you've already drawn. If you need help, simply type in the accompanying program and run it. The computer will assist you in moving from one location in the maze to another, in the proper order. If you need more help, simply type "H" for help, and the computer will advise you which exit to take from each location.

Modifications for Other Computers/Maze

For the Apple II, Apple II plus, and Apple IIe change lines 130, 210, and 310 to read

```
130 HOME: PRINT: PRINT
210 PRINT "THEN PRESS THE RETURN KEY."
310 HOME: PRINT: PRINT
```

For the Atari 400 and the Atari 800 add line 50:

```
50 DIM A$(25), B$(25), R$(25)
```

Also, change lines 130, 210, and 310 to read

```
130 PRINT CHR$(125): PRINT: PRINT
210 PRINT "THEN PRESS THE RETURN KEY."
310 PRINT CHR$(125): PRINT: PRINT
```

For the Commodore 64 and VIC-20 change lines 130, 210, and 310 to read

```
130 PRINT CHR$(147): PRINT: PRINT
210 PRINT "THEN PRESS THE RETURN KEY."
310 PRINT CHR$(147): PRINT: PRINT
```

In addition, if you have a VIC-20, you can avoid breaking words at the end of lines by changing lines 140 and 200 to

```
140 PRINT "MOVE FROM "; A$; " TO "
200 PRINT "PRESS 'N' FOR NEXT"
```

and adding lines 145 and 205:

```
145 PRINT B$: PRINT
205 PRINT "DESTINATION;"
```

For the TI-99/4A, use the version that appears below. (No Timex Sinclair 1000 version is given, since TS 1000 BASIC does not accept READ or DATA statements.)

```
100 READ A$
110 H=0
120 READ E,B$
130 CALL CLEAR
140 PRINT "MOVE FROM ";A$;" TO ";B$::
150 IF H=0 THEN 170
160 PRINT :"USE EXIT MARKED ";CHR$(E)
170 PRINT :
180 IF H=1 THEN 200
190 PRINT "PRESS 'H' FOR HELP OR"
200 PRINT "PRESS 'N' FOR NEXT GOAL;"
210 PRINT "THEN PRESS ENTER KEY."
220 INPUT R$
230 IF R$="H" THEN 260
240 IF R$="N" THEN 280
250 GOTO 130
260 H=1
270 GOTO 130
280 IF B$="OUTPUT" THEN 310
290 A$=B$
300 GOTO 110
310 CALL CLEAR
320 PRINT "YOU DID IT ALL!":
330 END
340 DATA INPUT,66,MEMORY,77
350 DATA THE ALU,75,MEMORY,76,OUTPUT
```

IGPAY ATINLAY ANSLATORTRAY (Pig Latin Translator)

A READER-WRITTEN PROGRAM BY ERIC GUSTAVSON

We keep our family's TI-99/4A in the spare bedroom. The walls in there are totally covered with shelves of family books—mostly nonfiction books—things like astronomy and woodworking. So when I finished my program *Pig Latin Translator*, I grabbed the first book I saw, which happened to be *The Space Shuttle Operator's Manual* by Kerry Mark Joels and Gregory P. Kennedy. I typed in the first sentence to test my program: "HOW MUCH DOES IT COST TO LAUNCH A SATELLITE?" Let's see if you can translate that sentence into Pig Latin. The rules are: If a word begins with a vowel (a,e,i,o,u), simply add "HAY" to the end of it. If a word begins with a consonant (anything other than a,e,i,o,u), take the consonant sound off the beginning of the word, put it at the end, and add "AY." Following these two rules, your sentence should translate to: "OWHAY UCHMAY OESDAY ITHAY OSTCAY OTAY AUNCHLAY AHAY ATELLI-TESAY?" When those words appeared on my screen, I knew I had successfully written a program that would translate English sentences into Pig Latin.

ERIC GUSTAVSON, *a 15-year-old sophomore at Churchill-Chili Senior High School outside of Rochester, New York, frequently discusses computers with his father (who wrote this month's home insulation program). "My mom says it's all we ever talk about! I don't think so," counters Eric. "We only discuss them 20 percent of the time!"*

PHOTOGRAPH BY BERT GUSTAVSON

A lot of kids I know like to play games, which I like to do, too. But once you've mastered a game, and you get five hundred zillion points on it or something, then there's not much point in playing it anymore except to raise your high score. I like to program more than play games. It's more creative, because you can do whatever you want: You can make up your own rules and design your own graphics. The best part is when you see other people enjoying the program, and you know that you are the one who wrote it.

I spend about five to six hours a week at the computer. I first started programming in the beginning of 1982, and I've written about fifty programs total. The reason I program is to learn more about how a computer works. Eventually I'd like to design computers and computer peripherals, like printers or disk drives. I like to solve things. A lot of times I hear about a program idea and try to write it myself from scratch. That's how I wrote *Pig Lat-*

in Translator. I heard about a program that translated English words into Pig Latin and I thought it'd be fun to try and figure it out. I reasoned that the program would have to be able to accept a sentence as input, break it into separate words, translate them, and display them. So I wrote the accompanying program, in Extended BASIC for our TI-99/4A. It took me about five hours.

HOW THE PROGRAM WORKS

The first thing my program does is to DIMension variables, define colors, and display an input prompt. After accepting the input, the program records the starting position and length of each word within the sentence. Each word is then translated and displayed on the screen.

The ON ERROR statement in line 310 sends the program to line 690 whenever an error is found. But if you have mistyped one of the lines of the program, when the program reaches your mistyped line it will consider it to be an error and go to line 690, which prints "ERROR DETECTED IN SENTENCE." Thus, you'll have no idea which line you mistyped. To avoid this problem, leave out line 310 until you have run and debugged the program, and *then* add line 310 to the program to handle errors in the sentences you type in to be translated. Also, you don't need to type in any of the REM statements; they are there to explain the program, but don't affect its operation in any way.

When you have typed in, proofread, and tried the program, you can make sure it's running correctly by typing in the following words: "ALSO SING! STING STRING QUICK SQUEEZE YELLOW BY DON'T." The screen should go blank for a few seconds; then the computer should display: "ALSOHAY INGSAY! INGSTAY INGSTRAY ICKQUAY EEZESQUAY ELLOWYAY YBAY ON'TDAY." and also the message "PRESS ANY KEY TO TRANSLATE ANOTHER SENTENCE." When you press any key, the display clears and another input is prompted.

You may get an unusual mixture of uppercase and lowercase letters in the translation unless you press the ALPHA LOCK key down before typing in your sentence.

After you've played the program for a while, you might have fun modifying it by adding letters other than "AY/HAY". Or you might try altering it to translate Pig Latin words into English.

TI-99/4A/Pig Latin Translator

```
100 REM //////////////////////////////////
110 REM //////////////////////////////////
120 REM ////////PIG LATIN TRANSLATOR\\\\\\\\\
130 REM \\\\\\\\\BY ERIC GUSTAVSON//////////
140 REM \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
150 REM \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
160 REM
170 REM  Arrays ST and L hold the STarting
180 REM  position and Length of each word in
190 REM  the input string A$
200 DIM ST(75),L(75)
210 REM  K is used as an index to these
220 REM  arrays
230 K=0 :: CALL CLEAR :: CALL SCREEN(2)
240 FOR C=0 TO 12 :: CALL COLOR(C,16,1):: NEX
T C
250 DISPLAY AT(17,1):"ENTER THE ENGLISH SENTE
NCE"
260 DISPLAY AT(19,1):"YOU WANT TRANSLATED INT
O"
270 DISPLAY AT(21,8):"PIG LATIN"
280 REM  PU counts punctuation; WD is 1 when
290 REM  CH points inside a word and 0
300 REM  otherwise
310 ON ERROR 690
320 LINPUT A$ :: CALL CLEAR
330 IF A$="" THEN 310 :: PU=-1 :: WD=0
340 REM  This loop fills ST and L with the
350 REM  locations of the words to be
360 REM  translated
370 FOR CH=1 TO LEN(A$):: C$=SEG$(A$,CH,1)
380 IF C$<"A" OR(C$>"Z" AND C$<"a")OR C$>"z"
THEN 420
390 PU=0 :: IF WD=1 THEN 470
400 REM  We have found the start of a word
410 WD=1 :: K=K+1 :: ST(K)=CH :: GOTO 470
420 IF WD=0 THEN 470
430 IF C$=" " THEN 460
440 PU=PU+1 :: GOTO 470
450 REM  We have found the end of a word
460 WD=0 :: L(K)=CH-PU-ST(K)
470 NEXT CH :: IF WD=1 THEN L(K)=LEN(A$)-ST(K
)-PU+1
480 REM  Print any initial spaces or
490 REM  punctuation
500 IF ST(1)>1 THEN PRINT SEG$(A$,1,ST(1)-1);
510 REM  This loop translates each of the K
520 REM  words in A$
530 FOR T=1 TO K :: E$=SEG$(A$,ST(T),L(T))
540 REM  First we handle the special cases:
550 REM  words beginning with QU or SQU
560 IF SEG$(E$,1,2)<>"QU" THEN 580
570 PL$=SEG$(E$,3,(LEN(E$)-2))&"QUAY" :: GOTO
 790
580 IF SEG$(E$,1,3)<>"SQU" THEN 600
590 PL$=SEG$(E$,4,(LEN(E$)-3))&"SQUAY" :: GOT
O 790
600 REM  This loop searches the first 4
610 REM  letters of the word for a vowel
620 FOR LT=1 TO 4
630 S$=SEG$(E$,LT,1):: IF LT<>1 AND(S$="Y" OR
 S$="y")THEN 730
640 IF S$="A" OR S$="E" OR S$="I" OR S$="O" O
R S$="U" THEN 710
650 IF S$="a" OR S$="e" OR S$="i" OR S$="o" O
R S$="u" THEN 710
660 NEXT LT
670 REM  None of the first four letters is a
680 REM  vowel
690 PRINT "ERROR DETECTED IN SENTENCE" :: PRI
NT :: PRINT A$ :: PRINT
700 PRINT "PRESS ANY KEY TO TRY AGAIN." :: GO
TO 870
710 REM  We found a vowel
720 IF LT=1 THEN 750
730 X$=SEG$(E$,1,LT-1):: Y$=SEG$(E$,LT,(LEN(E
$)-(LT-1)))
740 PL$=Y$&X$&"AY" :: GOTO 790
750 PL$=E$&"HAY"
760 REM  Print the translation of the current
770 REM  word plus punctuation and blanks
780 REM  that follow it
790 PRINT PL$;:: IF ST(T)+L(T)-1<LEN(A$)THEN
810
800 PRINT :: GOTO 840
810 IF T<K THEN 830
820 PRINT SEG$(A$,ST(T)+L(T),LEN(A$)-ST(T)-L(
T)+1);:: GOTO 840
830 PRINT SEG$(A$,ST(T)+L(T),ST(T+1)-ST(T)-L(
T));
840 NEXT T
850 PRINT :: PRINT :: PRINT A$ :: PRINT :: PR
INT
860 PRINT "PRESS ANY KEY TO TRANSLATE":"ANOTH
ER SENTENCE."
870 CALL KEY(0,K,S):: IF S=0 THEN 870 ELSE 23
0
```

ARE YOUR HEATING DOLLARS GOING OUT THE WINDOW?

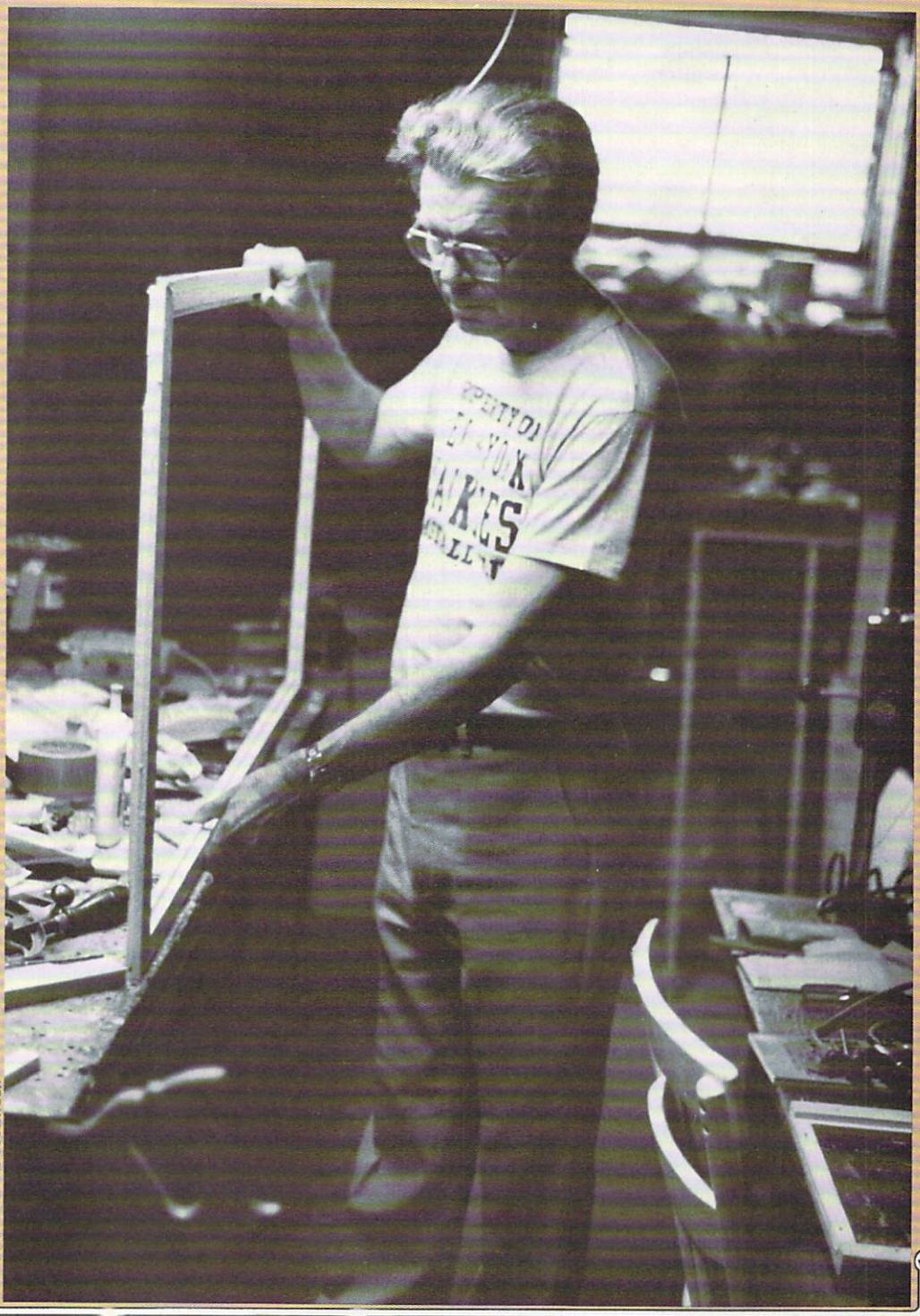
Learn Cost-Efficient Insulation with This Program

A READER-WRITTEN PROGRAM BY BERT GUSTAVSON

Winters in Rochester, New York, can be formidable. In a normal winter, the temperature can stay below freezing from mid-December until early March, with a few days of thaw to provide brief respite from the cold. Winds often whip the snow into drifts, and slippery roads and poor visibility due to the swirling snow make driving hazardous.

In the winter of 1976-77, when my fuel prices began skyrocketing, I started upgrading the heating efficiency of my house. I began by adding insulation in the ceiling, building enclosed vestibules for the front and back entrances of the house, and insulating around the water heater and all hot-water pipes from the heater to the faucets.

Then I put my TI-99/4A to work to determine where my heating dollars were going. The accompanying program, which I wrote in TI BASIC, will tell you which parts of the house are allowing the greatest amount of heat to escape and how much



PHOTOGRAPH BY ERIC GUSTAVSON

BERT GUSTAVSON *is a copy editor in the Sunday/Features Department of the* Democrat and Chronicle *in Rochester, New York, and is the father of four. He uses his TI-99/4A to play games with his son Eric (who wrote this month's* Pig Latin *program), to balance his checkbook, and to help keep his house warm during the long winter months.*

money you can save by the investments in insulation, caulking, weatherstripping, etc., that you are considering. By comparing the figures with the cost of the improvements, you can determine which potential investments would be most cost effective.

Of course, this information is valuable whether you have yet to do any weatherizing or have already begun and are considering further steps. (If you do choose to do insulation yourself, be sure you learn proper installation techniques or you will not get the result you want.)

As is true with most calculations performed on a home computer, you could accomplish the same thing with a calculator, with an abacus, or with plain old-fashioned arithmetic using a pencil and paper. The advantage of writing a computer program to do the work is that you can change the numbers and quickly get answers for a variety of situations: How much will I gain by changing to double-glazed windows? To triple-glazed? What about adding six inches of insulation in the attic? Twelve inches? Eighteen?

Before you run the program—in fact, before you start to add insulation or do any other weatherization—you should know what your present conditions are. The first thing you should do is find out how much insulation you now have. In the case of an unfinished attic that's fairly easy: Just go into the attic with a ruler and measure the depth of the insulation. The R-value of fiberglass insulation is roughly R-3 per inch of insulation. (R-value is a measure of the resistance of a material to the flow of heat.) Fiberglass insulation is available in standard thicknesses of 3½ inches (R-11) and 6 inches (R-22). R-values of loose-fill cellulose insulation (made of ground-up newspapers treated with a fire-retardant chemical) are slightly higher per inch of thickness.

Determining the R-value of insulation in the walls of an existing house is a bit tougher. You can probe into the wall cavity next to an electrical outlet to find out whether there is any insulation there; *turn off the electricity before attempting to probe into the wall cavity.* In an older house—one with the old standard of 2-by-4 wall studs—the chances are the walls have R-11 insulation. Your local utility company, heating oil supplier, or building materials dealer can help you determine the R-values of your home.

You can keep a better check on your heat use if you keep accurate records of your heating bills and fuel consumption. If you heat with natural gas, your monthly bill will show the amount of fuel used (usually in hundreds of cubic feet). Electric bills will show consumption in kilowatt hours (kwh). Oil bills show the number of gallons delivered.

Before running the heat-loss calculation program, you also will need to know the areas of the various elements of your house. In a simple house, the area of the ceiling is just the width of the house multiplied by the length. The area of the walls is the perimeter of the house multiplied by the height of the walls from floor to ceiling. Measure windows and doors from casing to casing on the sides and from top to sill. Multiply these two figures to get the area of each window and door. Add all the areas together to get the total window and door area. The volume of a heated space is the floor area times the ceiling height. Descriptions in the program will help you decide the air-infiltration factor, that is, the airtightness of your house. Older, drafty houses can have a complete change of air (an air exchange) every five minutes, while the new superinsulated houses might have one exchange per hour.

HOW THE PROGRAM WORKS

Lines 120 through 150 ask for the total amount of fuel you use (YR) and its cost (DL). If you use the same fuel for heat and for hot water, the June, July, and August consumptions are requested in lines 210, 220, and 230. (If your water heater doesn't use the same fuel as your heating system, choosing answer 2 in line 180 will make the program skip to line 250.)

Lines 250–620 accept input for areas and R-values of the various elements of the house, total volume, and airtightness. When answering the glazing questions in lines 390–410, if not all the windows have the same glazing, use an average figure. For example, if only half of your windows had storm windows over them (and if all your windows were approximately the same size), you would give your present glazing as 1.5. You can count a typical solid wood door with a few single panes of glass as double glazing.

Line 640 sets the unit cost of fuel (UCT) equal to the total dollars divided by the total amount of fuel used. Line 650 calculates the amount of fuel used for heating by averaging the June, July, and August use and multiplying by 12, assuming that the fuel used during the summer is for water heating only and that the water heating use is about the same throughout the year.

Line 660 sets the heat loss through the ceiling (LA) equal to the area of the ceiling (AC) divided by the R-value of the ceiling (RC).

Line 670 sets the heat loss through the walls (LW) equal to the area of the walls (AW) minus the area of the windows and doors (WIN) divided by the R-value of the walls (RW).

Line 680 sets the loss through the windows and doors (LT) equal to the area of the windows and doors divided by the R-value of the windows and doors (GL) (1 for single glazing, 2 for double glazing, 3 for triple).

If any floor area is over an unheated space, such as a room over a crawlspace, line 700 sets the heat loss through floors over unheated spaces (LF) equal to the area of such floors (FL) divided by their R-value (RF).

Line 710 sets the heat loss through air exchange (LV) equal to the volume of the house (VOL) multiplied by the air-infiltration factor (TR) divided by 50, to put it into proportion with the other losses.

Lines 720–770 perform the same calculations using the proposed new insulation factors.

Line 780 sets the total heat loss (TOT) equal to the sum of the individual heat-loss figures, and line 790 sets the heat loss per unit of fuel (LPU) equal to total heat lost divided by fuel used.

In lines 810 and 820, the present (PRE) and proposed (PRO) heat losses in *dollars* through the ceiling are set equal to the attic heat losses (LA and NA) divided by the heat loss per unit of fuel multiplied by

COST OF HEAT LOSS

Present	Proposed	Savings
CEILING $35	$25	$10
WALLS $62	$31	$31
WINDOWS AND DOORS $68	$45	$23
AIR TURNOVER $133	$80	$53

the unit cost. (The INT statement is used to round down the figure to whole dollars.) Line 830 prints the present and proposed figures and calculates and prints their difference (your potential savings).

The remaining lines perform similar calculations for the other elements of the house, indicating how much of the heating cost goes out through the walls, the windows and doors, the floors, and air exchange.

TESTING THE PROGRAM

Once you have typed in the program, you may want to check your typing by putting in the figures that I used and seeing whether you get the same results. Here is what I input for my house:

Fuel use 922; fuel bills 529.77; same fuel for heat as for hot water; June fuel use 25, July 49, and August 26; ceiling area 1064, present R-value 27, proposed 38; outside walls 924, present R-value 11, proposed 22; windows and doors 153; present glazing 2, proposed 3; area of floors over unheated spaces 0; total volume 7448; present airtightness 1, proposed 0.6. My results are shown in the table on the opposite page.

The figures show that adding R-11 to the ceiling would save only $10 for an investment of $200 or more. Improving the walls from the present R-11 to R-22 would save $31 but would be extremely expensive, because the exterior sheathing and shingles would have to be removed and new 2-by-4 studs and 3½ inches of more insulation would have to be added. Adding a third layer of glazing to the windows would save $23, and the job could be done one window at a time with storm windows I can build at comparatively little cost. Improving airtightness by caulking and weatherstripping would save $53, also at comparatively little cost.

Now put in the figures for your own house. Try running the program several times using various proposed improvements to see how quickly you can recover their cost in reduced fuel bills. Once you've made the improvements that are most beneficial for you, you can snuggle up to the fire, safe in the knowledge that your heating costs aren't going out the window.

TI-99/4A/Home Heat Loss Calculator

```
100 CALL CLEAR
110 PRINT "HOME HEAT LOSS CALCULATION"::::::
::::
120 PRINT "YEAR'S TOTAL FUEL USE (IN":"GALLON
S, KILOWATT HOURS,"
130 INPUT "OR CUBIC FEET)? ":YR
140 PRINT
150 INPUT "YEAR'S TOTAL FUEL BILLS?     ":DL
160 PRINT
170 PRINT "DO YOU USE THE SAME FUEL FOR":"HEA
T AS YOU USE FOR HOT":"WATER?"
180 INPUT "   (1) YES (2) NO ":F
190 PRINT
200 ON F GOTO 210,250
210 INPUT "  JUNE FUEL USE?    ":JN
220 INPUT "  JULY FUEL USE?    ":JL
230 INPUT "  AUGUST FUEL USE? ":AU
240 PRINT
250 INPUT "TOTAL AREA OF CEILING? ":AC
260 INPUT "  PRESENT R-VALUE?  ":RC
270 IF RC>0 THEN 290
280 RC=1
290 INPUT "  PROPOSED R-VALUE? ":NC
300 PRINT
310 INPUT "TOTAL AREA OF OUTSIDE WALLS?":AW
320 INPUT "  PRESENT R-VALUE?  ":RW
330 IF RW>0 THEN 350
340 RW=1
350 INPUT "  PROPOSED R-VALUE? ":NW
360 PRINT
370 PRINT "TOTAL AREA OF WINDOWS AND"
380 INPUT "OUTSIDE DOORS? ":WIN
390 PRINT "  PRESENT GLAZING:":"    (1) SINGLE
":"    (2) DOUBLE"
400 INPUT "    (3) TRIPLE? ":GL
410 INPUT "  PROPOSED GLAZING? ":NG
420 PRINT
430 PRINT "TOTAL AREA OF FLOORS OVER"
440 INPUT "UNHEATED SPACES? ":FL
450 IF FL=0 THEN 520
460 INPUT "  PRESENT R-VALUE?  ":RF
470 IF RF>0 THEN 490
480 RF=1
490 INPUT "  PROPOSED R-VALUE? ":NF
500 IF NF>0 THEN 520
510 NF=1
520 PRINT
530 PRINT "TOTAL VOLUME OF HEATED"
540 INPUT "SPACE? ":VOL
550 CALL CLEAR
560 PRINT "AIRTIGHTNESS OF HOUSE:":::"(.3) VE
RY TIGHT"::
570 PRINT "(.6) TIGHT - NEW HOUSE"::
580 PRINT "(1)  OLDER HOUSE, WEATHER-":TAB(6)
;"STRIPPED AND CAULKED"::
590 PRINT "(2)  OLD HOUSE, FAIRLY LOOSE"::"(4
)  LOOSE, DRAFTY"::
600 PRINT "(6)  VERY LOOSE, VERY DRAFTY":::
610 INPUT "  PRESENT AIRTIGHTNESS?  ":TR
620 INPUT "  PROPOSED AIRTIGHTNESS? ":NR
630 CALL CLEAR
640 UCT=DL/YR
650 H=YR-((JN+JL+AU)/3*12)
660 LA=AC/RC
670 LW=(AW-WIN)/RW
680 LT=WIN/GL
690 IF FL=0 THEN 710
700 LF=FL/RF
710 LV=VOL*TR/50
720 NA=AC/NC
730 NL=(AW-WIN)/NW
740 NT=WIN/NG
750 IF FL=0 THEN 770
760 FN=FL/NF
770 NV=VOL*NR/50
780 TOT=LA+LW+LT+LF+LV
790 LPU=TOT/H
800 PRINT "COST OF HEAT LOSS"::"PRESENT  PROP
OSED  SAVINGS"::
810 PRE=INT(LA/LPU*UCT)
820 PRO=INT(NA/LPU*UCT)
830 PRINT "CEILING"::"$";PRE;TAB(10);"$";PRO;
TAB(20);"$";PRE-PRO::
840 PRE=INT(LW/LPU*UCT)
850 PRO=INT(NL/LPU*UCT)
860 PRINT "WALLS"::"$";PRE;TAB(10);"$";PRO;TA
B(20);"$";PRE-PRO::
870 PRE=INT(LT/LPU*UCT)
880 PRO=INT(NT/LPU*UCT)
890 PRINT "WINDOWS AND DOORS"::"$";PRE;TAB(10
);"$";PRO;TAB(20);"$";PRE-PRO::
900 IF FL=0 THEN 940
910 PRE=INT(LF/LPU*UCT)
920 PRO=INT(FN/LPU*UCT)
930 PRINT "FLOORS"::"$";PRE;TAB(10);"$";PRO;T
AB(20);"$";PRE-PRO::
940 PRE=INT(LV/LPU*UCT)
950 PRO=INT(NV/LPU*UCT)
960 PRINT "AIR EXCHANGE"::"$";PRE;TAB(10);"$"
;PRO;TAB(20);"$";PRE-PRO
970 GOTO 970
```

We will pay $50 for reader-written programs we publish. Send two copies of your best original BASIC programs on diskette or tape, a listing (preferably printout), your phone number and computer model, and a stamped self-addressed mailer to The Programmer, FAMILY COMPUTING, 730 Broadway, NY, NY 10003. We cannot assume responsibility for loss of or damage to unsolicited materials.

WHAT'S IN STORE

SOFTWARE GUIDE

QUICK TAKES ON SOFTWARE— NEW AND NOTEWORTHY

Welcome to FAMILY COMPUTING's Software Guide, the most comprehensive listing available of two dozen of the newest, most noteworthy and/or best programs on the market. Our reviewers include families from all over the country who have judged the software according to the following criteria: long-term benefits and applications, adaptability, and advantages of using a computer for a given task. Following the chart are more detailed reviews of several of the programs.

Here's a rundown of the ratings categories and what they mean: **O** = Overall performance and refers to the software's performance given the limitations and capacities of the particular computer for which it is intended; **D** = Documentation, or the instructions and literature that accompany a program; **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users; **GQ** = Graphics quality, also evaluated in light of each particular brand's graphics capabilities; **EU** = Ease of use, after the initial learning period, which varies from computer to computer; **V** = Value for money, or how the software measures up to its price.

HOME BUSINESS & HOME MANAGEMENT

Title Manufacturer Price	Brief Description	Hardware/ Equipment Required	Backup Policy	Ratings O	D	EH	GQ	EU	V
COMPUTER MECHANIC Softsync, Inc. 14 E. 34th St. New York, NY 10016 (212) 685-2080 cassette $21.95 disk $26.95 ©1983	Maintains car records, aids in routine automobile maintenance, helps save on mechanic bills with troubleshooting guide. †	Commodore 64,disk, cassette.	Defective disks replaced free.	★★★★	★★★	★★★	★★★★	E	★★★★
MICRO COOKBOOK Virtual Combinatics P.O. Box 755 Rockport, MA 01966 (617) 546-6553 $40 ©1983	Versatile meal planner includes food buying and storage guide. Accesses preprogrammed recipes or your own creations according to nationality, ingredients, or other categories.	Apple II/II+/IIe,64K disk; IBM-PC,64K disk.	Refund if not fully satisfied; $12 fee for additional copies.	★★★	★★	★★★	n/a	E	★★★
THE ORGANIZER Timex Computer Corp. Waterbury, CT 06725 (800) 248-4639 $16.95 ©1982	A sample program introduces user to flexible file system. Organizes data entries alphabetically or numerically. Makes optimum use of Timex capabilites. †	TS 1000,16K cassette.	Defective cassettes replaced free.	★★★★	★★★	★★★	n/a	E	★★★★
PROFILE Radio Shack One Tandy Center Fort Worth, TX 76102 (817) 390-3939 $79.95 ©1981	Keeps track of home inventory, records, mailing lists with simple, reliable data-base manager. Simulates basic 3 × 5 file.	TRS-80 I/III,32K disk.	Defective disks replaced through dealer.	★★★	★★★	★★	n/a	A	★★★
SCREENWRITER II Sierra On-Line Sierra On-Line Bldg. Coarsegold, CA 93614 (209) 683-6858 $129.95 ©1982	Powerful word processor with footnote and index capacities. Allows for great flexilibity in determining manuscript appearance. †	Apple II/II+/IIe, 48K disk.	Defective disks replaced free w/ in 90 days; $5 fee thereafter.	★★★★	★★★	★★★	n/a	E	★★★

RATINGS KEY O Overall performance; **D** Documentation; **EH** Error handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; n/a Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

WHAT'S IN STORE SOFTWARE GUIDE

EDUCATION/FUN LEARNING

Title Manufacturer Price	Brief Description	Hardware/ Equipment Required	Backup Policy	Ratings O	D	EH	GQ	EU	V
THE ALPHABET ARCADE Program Design, Inc. 95 E. Putnam Ave. Greenwich, CT 06830 (203) 661-8799 cassette $18.95 disk $23.95 ©1983	Inventive arcade-like games drill and practice reading skills. Variety of skill levels—spelling through alphabetization—ensures continued use, software growth with children. †	Atari 400/800, 16K cassette, 24K disk. Joystick required.	Defective material replaced free; $5 if user damaged.	★★★	★★★	★★★	★★★	E	★★★★
ATOR, THE ABC-GATOR Timex Computer Corp. Waterbury, CT 06725 (800) 248-4639 $12.95 ©1982	Catchy melody accompanies alphabet lesson. In two additional games, kids guide gator through the swamp with alphabet skills. Very sophisticated for the Timex.	TS 1000, 16K cassette.	Defective cassettes replaced free.	★★★	★★★★	★★★★	★★★★	E	★★★★
BUMBLE PLOT The Learning Company 545 Middlefield Rd., #170 Menlo Park, CA 94025 (415) 328-5410 TRS-80 cassette $45 Apple disk $39.95 TRS-80 disk $65 ©1982	Teaches graphing and mapping skills, integers, and beginning computer graphics with the help of Bumble, a creature from the planet Furrin.	Apple II/II+/IIe, 48K disk; TRS-80 Color, 16K disk, cassette.	Defective material replaced free w/ in 90 days; $10 fee thereafter.	★★★	★★	★★★★	★★★★	A	★★★
ERNIE'S QUIZ Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010 $50 ©1982	Four games with appealing, lo-res graphics teach basic computer skills (booting a disk, using keyboard), spelling, and counting. Games feature "Sesame Street" characters. †	Apple II+/IIe, 64K disk. Paddles required.	Package contains free backup disk.	★★	★★★★	★★★★	★★★	E	★★
GORTEK AND THE MICROCHIPS Commodore 1200 Wilson Dr. West Chester, PA 19380 (215) 431-9100 $24.95 ©1982	Space storybook tutorial teaches load and run, keyboard skills, and elementary BASIC programming to ages 9–14, younger if parents participate. †	Commodore 64, VIC-20, cassette.	Defective cassettes replaced free.	★★★★	★★★★	★★★★	★★★	E	★★★★
GULP & ARROW GRAPHICS EduFun Division Milliken Publishing Co. 1100 Research Blvd. St. Louis, MO 63132 (800) 325-4136 cassette $29.95 disk $32.95 ©1982	Kids must answer basic math problems to escape the jaws of a huge shark. Games provide drill and practice in multiplication and addition. Bonus game is a simple graphics package.	Atari 400/800, 32K disk, 16K cassette; Apple II+/IIe, disk.	Defective material replaced free.	★★★	★★★	★★★	★★★★	E	★★★
HEY DIDDLE DIDDLE Spinnaker Software 215 First St. Cambridge, MA 02142 (617) 868-4700 $29.95 ©1983	Clever graphics and tunes accompany display of nursery rhymes. Unusual rhyming games help children learn fundamentals of poetry. †	Apple II+/IIe, 48K disk; Commodore 64, 64K disk; Atari 400/800, 32K disk; IBM-PC, 64K disk. Joystick required for Atari and Commodore.	Disks replaced free w/in 30 days; $5 fee thereafter.	★★★★	★★★	★★★	★★★★	A	★★★★
SQUARE PAIRS Wizware/ Scholastic Inc. 730 Broadway New York, NY 10003 (212) 505-3000 cassette $29.95 disk $39.95 ©1983	Allows for creation of any number of your own match games to strengthen memory and teach lessons, facts of your choice. †	Apple II/II+/IIe, 48K disk; Atari 400/800, 16K cassette; TI-99/4A, 16K cassette; VIC-20, 13K cassette.	Defective material replaced free w/ in 60 days; $5 fee thereafter.	★★★	★★★	★★★★	★★★	E	★★
STICKYBEAR ABC Xerox Education Pub. Software Division 245 Long Hill Rd. Middletown, CT 06457 (203) 347-7251 $39.95 ©1983	Alphabet, keyboard, and prereading skills taught through lively graphics and sounds entertaining to very young children. Package includes cute, noncomputer-related instructive materials.	Apple II/II+/IIe, 48K disk.	Defective disks replaced free w/ in 90 days; $10 fee thereafter.	★★	★★	★★★★	★★★★	E	★

RATINGS KEY **O** Overall performance; **D** Documentation; **EH** Error handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; n/a Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

WHAT'S IN STORE SOFTWARE GUIDE

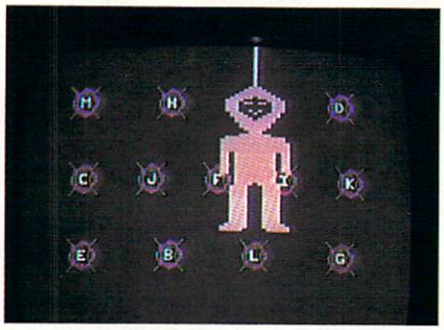
GAMES

Title Manufacturer Price	Brief Description	Hardware/ Equipment Required	Backup Policy	Ratings O	D	EH	GQ	EU	V
APPLE PANIC Broderbund Software 1938 Fourth St. San Rafael, CA 94901 (415) 456-6424 $24.95 ©1981	Subdue deadly falling apples in this popular arcade game adapted for home use. Frustrating program fault makes satisfying play almost impossible.	Apple II/II+/IIe, 48K, disk; Atari 400/800, 24K disk, 16K cassette; IBM-PC with Graphics Adapter, 64K disk. Atari requires joystick.	Defective material replaced free; $5 fee if user damaged.	★	★ ★	★ ★ ★	★ ★	D	★
E.T. PHONE HOME! Atari 1312 Crossman Ave. P.O. Box 61657 Sunnyvale, CA 94086 (800) 538-8543 $49.95 ©1983	Help E.T. phone home. Guide Elliot to glowing telephone parts. Intended under-10 audience frustrates easily because of poor joystick control.	Atari 400/800, 16K cartridge. Joystick required.	Defective disks replaced free.	★ ★	★ ★	★ ★	★ ★	A	★
FLIGHT SIMULATOR Psion Ltd. Available through Timex Waterbury, CT 06725 (800) 248-4639 $19.95 ©1982	Navigate and fly small aircraft. Learn fundamentals of piloting while launching, landing, and navigating smoothly. †	TS 1000, 16K cassette.	Defective cassettes replaced free.	★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★	A	★ ★ ★ ★
FROGGER Sierra On-Line Sierra On-Line Bldg. Coarsegold, CA 93614 (209) 683-6858 $34.95 ©1982	Split-second timing and careful navigation required to guide frog safely across dangerous highway and treacherous waterway home to lily pad refuge.	Commodore 64, 32K disk, 16K cassette; Apple II/II+/IIe, 48K disk; IBM-PC with Graphics Adapter, 64K disk; Atari 400/800, 32K disk, 16K cassette. Joystick optional.	Defective material replaced free w/ in 90 days; $5 fee thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★ ★	E	★ ★ ★
KABUL SPY Sirius Software, Inc. 10364 Rockingham Dr. Sacramento, CA 95827 (916) 366-1195 $39.95 ©1981	Guide undercover agent into Afghanistan to rescue top scientist. Frustrating, but rewarding adventure game. Some parents may feel that the language is inappropriate for their children.	Apple II/II+/IIe, 48K disk.	Defective disks replaced free; $5 if user damaged.	★ ★ ★	★ ★	★ ★ ★	★ ★	D	★ ★ ★ ★
KEY QUEST Micro Ware Dist. Inc. P.O. Box 113 Pompton Plains, NJ 07444 (201) 839-3478 $34.95 ©1983	Roam through treasure troves, fending off monsters who inhabit the vaults. Combines chase and adventure game elements. †	VIC-20, cartridge. Joystick required.	Defective disks replaced free w/ in 90 days.	★ ★ ★	★ ★	★ ★	★ ★	E	★ ★ ★
MAZOGS Softsync, Inc. 14 E. 34th St. New York, NY 10016 (212) 685-2028 $19.95 ©1982	Locate treasure buried deep within maze using hints gained along the way. Unusual graphics for Timex and exciting play in this addictive strategy game.	TS 1000, 16K cassette.	Defective cassettes replaced free.	★ ★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★
RAT HOTEL Creative Software 230 E. Caribbean Dr. Sunnyvale, CA 94086 (408) 745-1655 $29.95 ©1983	As the rat, you must avoid traps, poisoned cheese, and the mean janitor while scurrying down to the basement in search of food.	VIC-20, cartridge. Joystick required.	Defective cartridges replaced free.	★ ★ ★	★ ★ ★	★ ★	★ ★ ★	E	★ ★
WIZARDRY Sir-tech Software, Inc. 6 Main St. Ogdensburg, NY 13669 (315) 393-6633 $50 ©1981	Create and direct fantasy characters on a quest combatting the forces of evil in this famous role-playing adventure game. †	Apple II/II+/IIe, 48K disk; IBM-PC, 64K disk.	Defective or damaged disks replaced free w/ in 30 days; $5 fee thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★	E	★ ★ ★ ★
ZORK I Infocom, Inc. 55 Wheeler St. Cambridge, MA 02138 (617) 492-1031 $39.95 ©1979	Venture throughout a mysterious house in search of treasure. Descend into the underground empire Zork, in this text adventure game. †	Apple II/II+/IIe, 32K disk; Atari 400/800, 32K disk; IBM-PC 48K disk. Also on TRS-80 I/III from Radio Shack.	Defective or damaged disks replaced free w/ in 90 days; $5 fee thereafter.	★ ★ ★ ★	★ ★ ★	★ ★ ★ ★	n/a	E	★ ★ ★ ★

RATINGS KEY **O** Overall performance: **D** Documentation; **EH** Error handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money: ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; n/a Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

WHAT'S IN STORE
SOFTWARE REVIEWS

EDUCATION/ FUN LEARNING



The Alphabet Arcade

HARDWARE REQUIREMENTS: Atari 400/ 800, 16K cassette, 24K disk; joystick required
MANUFACTURER: Program Design
PRICE: $23.95 (disk); $18.95 (cassette)

If your child needs some practice with the alphabet, this package would make a good addition to your software library.

In the first of three programs, the child helps Diver Dan remove lettered mines and fish from the depths of the sea in alphabetical order. The second program, "Letters for Lisa," features a frog-like creature gobbling up letters, again in alphabetical order, as they move across the screen. In the most advanced game, "Order Please," the player is given a list of words to alphabetize. This game accommodates three different skill levels, and is timed, as well, so a player can try to improve speed with accuracy.

One of *Alphabet Arcade*'s strongest attributes is the variety of skills it challenges. "Diver Dan" and "Letters for Lisa" use colorful graphics and entertaining sounds that delight younger kids. (The only limits to my five-year-old daughter's use was my tiring of her repeatedly singing the letters of the alphabet!) At the same time, the most difficult program on the disk is not easy by any youngster's standards. Older children can compete for the best scores.

At five, my daughter found "Order Please" too difficult, but she'll grow into it in a few years. It's disappointing to spend so much money on software only to find your child quickly mastering the skills and shelving the program. I'm glad to say that with *Alphabet Arcade*, my little girl can get good alphabet practice now; plus, she will be learning something substantial for years to come. The software won't grow dusty on the shelves. —DEAN VAN DE CARR

Ernie's Quiz

HARDWARE REQUIREMENTS: Apple II plus/IIe, 64K disk; paddles required
MANUFACTURER: Children's Television Workshop/Apple Computer
PRICE: $50

Ernie's Quiz is a package of four simple games intended for four-to seven-year-olds. Two of the games make use of familiar faces from "Sesame Street." In "Guess Who," the TV show's characters appear on the screen one at a time while the child guesses their identities. In "Ernie's Quiz," the point is to guess which character is being described from the series of given clues. Unless your kids are "Sesame Street" fans, these two games aren't likely to be very captivating. The other two games can be fun for any young child: "Jelly Beans" involves counting the number of beans in a jar, and "Face It," creating a face from a selection of different features.

The low-resolution graphics are cute, the games simple, and "Guess Who," very tolerant of spelling errors (important in software for young children). Children find the games fairly interesting for a while. But "Jelly Beans" and "Ernie's Quiz" could work almost as well in print; they really do not take advantage of the computer's capacities. Also, portions of the programs run on without giving you a chance to stop them at mid-play. One young user said at one point, "Oh no, how do I stop the computer?" I shared the same feeling as the picture in "Guess Who" appeared dot by dot on the screen, yet there was no way to make the picture pause without also making a guess.

A special word about the manual: It includes detailed suggestions for noncomputer activities. This is typical of CTW's emphasis on stimulating imagination through simple, readily available materials. Such activities are valuable, but the same kinds of tips can be obtained from CTW publications that cost far less than this expensive software.

—TONY MORRIS

Gortek and the Microchips

HARDWARE REQUIREMENTS: Commodore 64, VIC-20, cassette
MANUFACTURER: Commodore
PRICE: $24.95

Perhaps not every child clamors to learn computer programming. But for the majority who do, Commodore's *Gortek and the Microchips* is one of the freshest, most original approaches around. In fact, you would have trouble convincing my kids that *Gortek* is anything but a game!

With its big, colorful storybook-style manual and two cassette tapes containing 11 programs, *Gortek* can take a child who is a total novice all the way from learning how to load and run programs, through an introduction to keyboard and computer concepts, up to BASIC programming.

According to its packaging, *Gortek* was designed for 10- to 13-year-olds. But at our house, five-year-old Molly and my seven-year-old twins, Timmy and James, have been using it for several months. They started out with lots of help from Mom, Dad, and big sister Beth (14). Now they load and run programs pretty much on their own. They can copy programs from the manual with minimal grown-up error checking. Kids immediately pick up on the idea that they must learn programming in order to help Gortek save the planet Syntax from nasty Zitrons.

At $24.95, *Gortek* costs less than most games for Commodore systems. It may very well be one of the

continued on page 96

WHAT'S IN STORE
SOFTWARE REVIEWS

continued from page 95

best software buys on the market. Its only problem is one common to cassette programs—long loading time. It also has another drawback, and I speak from bitter experience. Once your kids have *Gortek*, they might never surrender the family computer again!

By the way, nonprogramming parents will learn some computer basics with *Gortek*, too. What better way to learn than by sharing a computer adventure with your children?

—BETSY BYRNE

Hey Diddle Diddle

HARDWARE REQUIREMENTS: Apple II plus/IIe, 48K disk; Commodore 64, 64K disk; Atari 400/800, 32K disk; IBM-PC, 64K disk; joystick required for Atari and Commodore
MANUFACTURER: Spinnaker
PRICE: $29.95

Four lines of a nursery rhyme appear accompanied by illustrations that take shape slowly. Then follows a delightful bit of music and the final four lines of the rhyme. No wonder young children find this entire display spellbinding. Even if they are too young to read the rhymes, they are captivated by the clever graphics and music.

Besides this first entertaining piece, there is more. In "Rhyme Game" players unscramble lines, rearranging them into the correct order. You can choose to unscramble either the first four or all eight lines of each rhyme. For an added challenge, you can add a timer that adjusts your score the faster you unscramble the rhymes. Two players can alternate until one finally completes the rhymes correctly. A scoreboard keeps track of things like high scores and total rhymes solved.

Kids reacted enthusiastically to the pace, graphics and sound of *Hey Diddle Diddle*. One unexpected reaction came from Matt. At 11, he is just above the suggested three-to-10-year-old range. He immediately started out by trying to unscramble all eight lines of each rhyme. For the most part Matt didn't know the rhymes, so he had to proceed logically—trying to figure out how the poet might have put the eight lines together, thinking about what lines rhymed with what, and what pattern of rhyming might be used. He learned how some lines "set the stage," while others "explain what happens afterwards," and so on.

Faults are few, and tolerable in this striking piece of software that adds exciting, unusual dimensions to building kids' poetry and reading skills.

—TONY MORRIS

Square Pairs

HARDWARE REQUIREMENTS: Apple II/II plus/IIe, 48K disk; Atari 400/800, 16K cassette; TI-99/4A, 16K cassette; Commodore VIC-20, 13K cassette
MANUFACTURER: Wizware/Scholastic Inc.
PRICE: $39.95 (disk); $29.95 (cassette)

Boys and rock groups seem to be all that is interesting to 15-year-old Kristin these days. But I did manage to sit her down at the computer recently by asking her the names of some of her friends and who they were "going" with, and feeding this "data" into Wizware's *Square Pairs* program. She played the resulting game a couple of times, and then created one of her own called "Rock," which required matching rock groups with their hit recordings.

An infinite number of these kinds of games can be created for *Square Pairs*. The object of each is to recognize and match associated pairs—countries with their capitals, for instance—a little bit like the old TV show, "Concentration."

The screen displays a grid of numbered boxes. A player enters a first box number, signifying one word, and then a second number for another word. The computer then announces "match" or "no match." A successful pair gives the matchmaker another turn. A mismatch, and play passes to the next participant.

Ten samples—including elementary word and geography games—are provided, but the useful part of this program is the ease with which you will be able to create new match games.

Younger kids will find this an entertaining way to learn about almost anything—from family facts to historical tidbits—while strengthening their memory powers.

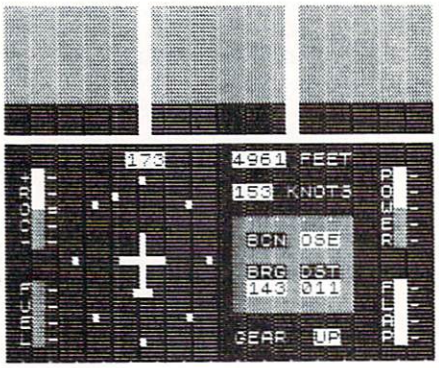
The manual is elegantly brief and informative, the program easy to use and very forgiving of mistakes. For the price, however, it should provide added capacities—maybe the matching of three items or multiple matching of one.

—DAVID WILSON

GAMES

Flight Simulator (Strategy)

HARDWARE REQUIREMENTS: TS 1000, 16K cassette
MANUFACTURER: Psion Ltd./available through Timex
PRICE: $19.95

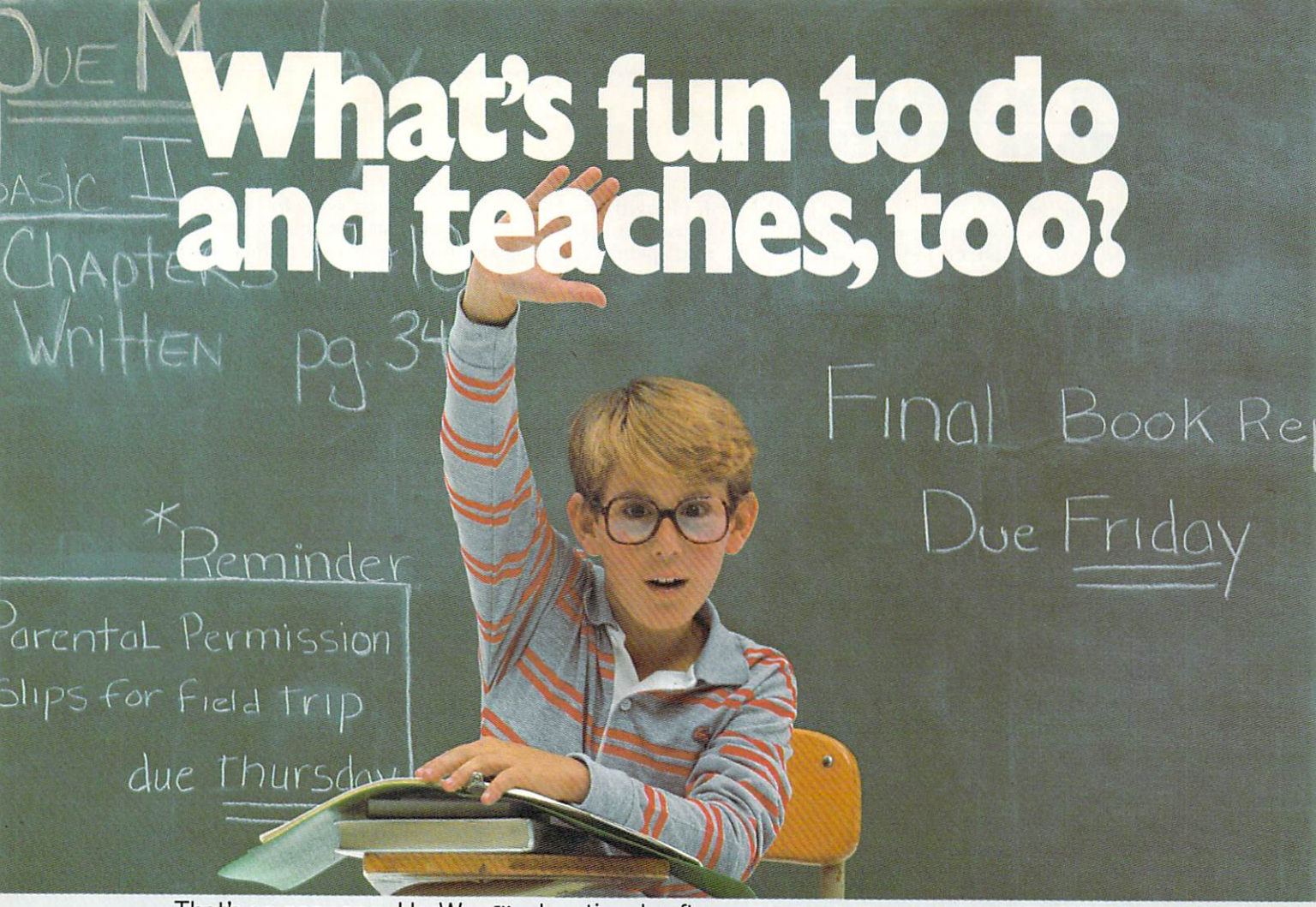


Because of the high cost of flying, many pilots are trained with computer flight simulators. Now Timex has a game that simulates such simulation. As the pilot of a small, high-performance aircraft, you use the monitor screen to safely launch, navigate, and land. All this, via a lot of fun.

As a licensed pilot, I found the flight instruments in the computerized cockpit to be reasonably faithful to real life. You climb, descend, turn left and right, accelerate and decelerate, while monitoring such things as fuel consumption and altitude.

continued on page 98

What's fun to do and teaches, too?



That's an easy one: HesWare™ educational software.

The children with the most answers in school are usually the children who enjoy learning. HesWare helps develop your child's interest in learning by making it fun. And along the way, develop familiarity and proficiency with computers—a skill that is becoming more and more essential to success.

HesWare educational software combines enjoyment with a creative learning experience. Unlike video games, HesWare educational programs involve your child—and that keeps their interest. Whether it's creating colorful and artistic pictures with Turtle Graphics, making up funny faces with Facemaker,™ or helping America's favorite canine, Benji, save kidnapped scientists (and learn about the solar system in the process,) or any of the programs in our education library, HesWare gives your children a positive attitude toward learning and technology.

It's not expensive to give your child a headstart on the future. HesWare programs are available for most popular home computers, including the Commodore VIC 20,™ Commodore 64,™ Atari,® and IBM.®

HesWare educational software. Just one of the ways HesWare is expanding the computer experience. And expanding your child's horizons. Look for them at your favorite software retailer.

Pleases the tough customer.

HesWare™

Human Engineered Software, 150 North Hill Drive, Brisbane, CA 94005
800-227-6703 (in California 800-632-7979) Dept. C20

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WHAT'S IN STORE
SOFTWARE REVIEWS

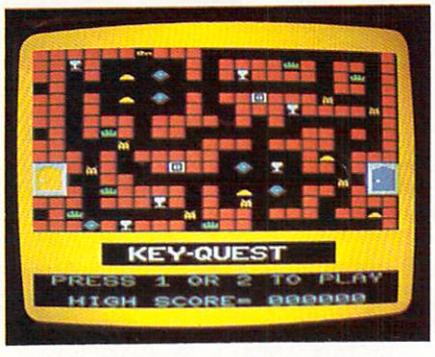
continued from page 96

For armchair pilots from six to 60, *Flight Simulator* is as instructional as it is fun. Its excitement is enhanced with a "wind effects" option, which adds the challenge of wind factor for more experienced fliers.

—JAMES ROBERTS

Key Quest (Arcade)

HARDWARE REQUIREMENTS: VIC-20, cartridge; joystick required
MANUFACTURER: Micro Ware
PRICE: $34.95



You're roaming through one of the great treasure troves of all time. Surrounded by riches beyond your wildest dreams, you progress from level to level, warding off the monsters who inhabit the 24 levels. They are doing their best to keep you from leaving alive. Your only weapon is a blaster, but it only fires right and left, not up and down, so don't get caught in a vertical passage. It may look simple, but don't let the illusion fool you.

Key Quest combines some of the best elements of both chase and adventure games. More than just a shoot-'em-up, *Key Quest* can be played by anyone, almost as soon as the picture appears on the monitor. The joystick control is easy to use and every member of the family can achieve some success in a relatively short period of time. The color graphics are delightful, if a bit primitive, but VIC-20 owners couldn't hope for a more enjoyable combination of arcade action and strategy.

—JAMIE DELSON

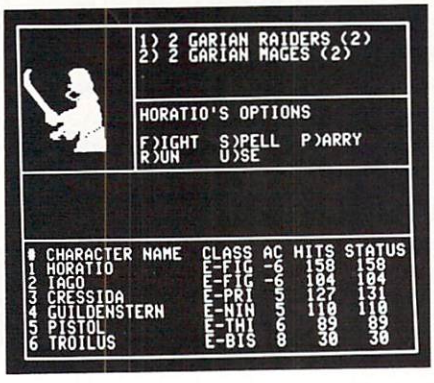
Wizardry (Adventure/ Fantasy)

HARDWARE REQUIREMENTS: Apple II/II plus/IIe, 48K disk; IBM-PC, 64K disk
MANUFACTURER: Sir-tech Software
PRICE: $50

It's the stuff of myth and legend. First, thou chooseth a throng of brave souls, and spendeth their gold on arms and equipment for their journey into the dungeons that lie far below the castle. With this crew thou set forth against all sorts of demons and monsters—kobalds, skeletons, orcs, and evil wizards. With patience and good use of ye olde noggin, ye shall acquire wisdom and power and ye shall triumph over darkness.

Since its release in 1981, *Wizardry* has been widely hailed as one of the most intriguing and exciting computer games ever produced. It has consistently placed highly in the sales charts, and its phenomenal success has prompted two sequels in an industry in which sequels are rare. The demand for more *Wizardry* is understandable: Having attained the highest level in the first one, that can't be the end of it. You've taken your characters through great adventures, so you simply can't let them retire. There are bigger and better adventures ahead.

Wizardry's only drawback is its screen—almost entirely devoted to clues, instructions, and written commands. Only a fraction of it depicts the maze through which you travel. But Sir-tech has cracked that problem: The third in the *Wizardry* series, *Legacy of Llygamyn* (which we will review in an upcoming issue) features a 3-D graphics display of your adventure, filling 80 percent of the screen.



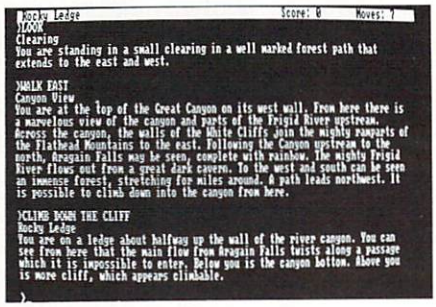
With or without full-screen graphics, *Wizardry* accomplishes what few home games can: It transports you to a world as fantastic as your imagination. Fun is hardly the word for a game that makes you think while you're free to dream.

—JAMIE DELSON

(Editor's note: *In the October issue of* FAMILY COMPUTING *we will take an in-depth look at the adventure game phenomenon, including the* Wizardry *series, and feature an interview with the series' creator, Andy Greenberg.)*

Zork I (Adventure)

HARDWARE REQUIREMENTS: Apple II/II plus/IIe, 32K disk
MANUFACTURER: Infocom
PRICE: $39.95



Trying to select the "best" adventure game is a lot like trying to select the "best" book. But if you're starting a library, everyone agrees that you should include some Dickens and Shakespeare; and if you're collecting adventure games, you're not finished until you have *Zork I.*

You explore the unknown terrain of a small house and the magical kingdom beneath it, typing in instructions to the computer, as in all text adventures. An unreliable flashlight (occasionally) reveals the nasty creatures—bent on your destruction—that lurk along the path. What's more, even if you manage to collect a bit of the booty, a "dastardly, antisocial" pickpocket is waiting to intercept you.

As a text adventure, *Zork* is unrivaled. For instance, you can choose to skip familiar, already trodden passages. Complete sentences—not pidgin—two-word commands, steer you through the underground empire. *Zork*'s playing features and detailed, witty responses are surpassed only by Infocom's more recent games, *Deadline* and *Suspended* (not to mention *Zork II* and *III.*)

Some adventures are more complicated, and some have fancy graphics, but *Zork I* is the one that changed adventuring from a computer novelty into sophisticated entertainment.

—ERIC GREVSTAD

WHAT'S IN STORE
SOFTWARE REVIEWS

HOME BUSINESS

The Organizer

HARDWARE REQUIREMENTS: Timex 1000, 16K cassette
MANUFACTURER: Timex
PRICE: $16.95

Excellently designed and documented, *The Organizer* permits the user to maintain files of almost any description for home or small business. Keyboard prompts are well documented and comprehensive. They include forward, backward, alter, select, inform, delete, reset, order, list, copy, and print. After reviewing and using a sample provided with the program to become familiar with its various commands, you may then design a format for data entry suited to your needs.

All data entered is automatically stored in alphabetical order regardless of the point of entry. Any item can be immediately displayed by the use of the "S" (select) key. Any numerical or alphabetical data can be listed in order by the use of the "O" (order) key. The "I" (inform) key displays the total number of files, the number of data categories, and the total percentage of available space that has been used.

Data can be changed or altered by the use of the "A" (alter) key and placing the cursor in the desired location. The cursor moves rapidly about the screen: left, right, up, or down for selection of categories to alter or order.

This versatile program stirs the imagination with its almost unlimited possible applications. I have used it to maintain inventory records, statements, and directories of many kinds.

The Organizer is a well-written, well-documented program—one of the best home and business applications available for that machine.

—JAMES ROBERTS

Screenwriter II

HARDWARE REQUIREMENTS: Apple II/II plus/IIe; 48K disk
MANUFACTURER: Sierra On-Line
PRICE: $129.95

Having learned to use a word-processing program, chances are you'll never willingly turn to the typewriter for much more than an envelope or two. Word-processing programs are many—some complex to use, some limited in capability. Prices range from $29.95 to several hundred dollars. Seldom do you find the right one among the first few you inspect. And often, after having lived with it for awhile, you discover things unnoticed earlier. Prepare to invest several hours in learning to use a WP program, and several more to become proficient.

Screenwriter II is my choice for word processing on the Apple for several reasons. It allows lowercase letters and 70 column lines (that means 70 spaces) without extra hardware. It permits intricate formatting (the way the words and lines will be printed on the page), and it has built-in footnoting and indexing procedures. The file-management commands are simple. These are just a few of its important features.

Screenwriter II has a few limitations that have driven me to a frenzy on occasion. Hyphenation is unwieldy. Loading, saving, and cleaning up files is a slow process. The slowness with which the program receives keyboard input doesn't bother me, but it might annoy the more proficient typist. Finally, *Screenwriter II* is not a simple system to learn. But it takes time to learn how to use any good, capable program.

Screenwriter II meets my needs for word processing on the Apple II plus more completely than any other WP program I have yet to find. It may be right for you too, but don't select it or any other word-processing software until you've inspected it in light of your requirements.

—DAVID WILSON

HOME MANAGEMENT

Computer Mechanic

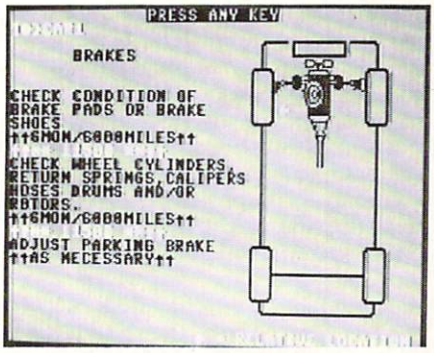
HARDWARE REQUIREMENTS: Commodore 64, disk and cassette
MANUFACTURER: Softsync
PRICE: $26.95 (disk); $21.95 (cassette)

When I received *Computer Mechanic* a few weeks ago, I was all set to take it over to a friend who runs an automobile shop. After all, what would an average mother of four want to do with such an impressive, but too-technical-sounding piece of software? After a quick reading of the back of the box, and a glimpse at the documentation, I realized that it was meant just for me and my '73 Pinto (an old, cranky beast that requires monthly attention).

Computer Mechanic has turned out to be a "white knight to the rescue" for situations in which (I blush to admit) I usually have to holler for my husband, or call the auto club.

One day, the *Computer Mechanic* and I solved part of the Pinto riddle, without any "help" from my skeptical husband. I loaded the *Computer Mechanic* and selected the "Diagnostic" section from the main menu. The screen that followed offered two choices: "Car won't start," and "Starts but runs rough." I chose the latter and was then given some more options, from which I chose "Rough idle." The *Computer Mechanic* suggested that I check my spark plug wires, which I did. I found, to my glee, that my plug wire was loose!

The program has the clue to such mysteries as oil changing, tire rotation, and engine tune-up. All I do is type in accurate records of when these chores were last attended to, and my Pinto's mileage at the time. This "When to Check" section, integrated with the program's data-base manager will provide specific maintenance schedules for dozens of cars, provided they are American-made. High-resolution graphics also show the location of items that require periodic checking. The program then gives detailed instructions on how to go about these checkups.



The *Computer Mechanic* is unlike any book you could buy about car maintenance. There is something very personal and encouraging about the way it walks me through the various procedures step-by-step. It will not turn someone into a grease monkey overnight, but it will put an end to those needless $25 trips to the garage. Just be careful that you don't become your neighborhood's local "white knight"! Me? I'm off to help my friend Nancy get her car started!

—BETSY BYRNE

WHAT'S IN STORE
NEW HARDWARE*

COMPUTERS

Adam

MANUFACTURER: Coleco Industries, Inc., 999 Quaker Lane S., West Hartford, CT 06110; (203) 725-6000
PRICE: $600

Coleco, the toy manufacturer first known for its swimming pools and then for its ColecoVision game machine, announced two years ago that it would make an expansion module to convert its game machine into a home computer. The company has now made good on that promise and thrown in a surprise—its independent Adam home computer system. The Adam comes complete in one box, with 80K RAM (expandable to 144K), a built-in word-processing program, and a letter-quality printer. Because the Adam's Smart BASIC is compatible with Apple's Applesoft BASIC, the computer will be able to run the many programs written for Apple computers. It will also be able to run CP/M programs, which a means a potentially huge software library will be available.

But most of this software is still in the planning stage. Instead of a cassette-tape or floppy-disk storage system, the Adam employs a "data pack" system. This data pack looks like a cassette tape, but works almost as fast as a floppy disk, according to Coleco. Since the data pack is a completely new type of storage system, virtually no software has been written in that format. However, the Adam has two built-in data-pack units, allowing an amazing 500K of storage space.

Atari 800XL

MANUFACTURER: Atari Inc., 1312 Crossman Ave., P.O. Box 61657, Sunnyvale, CA 94086; (408) 745-2820
PRICE: $299

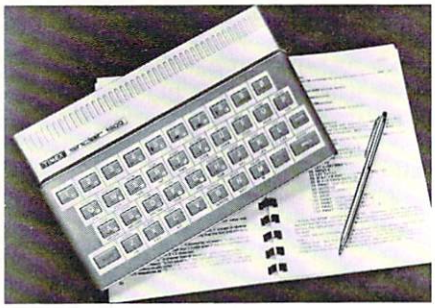
Atari's 800XL, the second computer of its "new generation" line that will replace the 400, 800, and 1200XL models, maintains the advanced sound (four voices) and high-resolution graphics (256 colors) that Atari computers are known for. The new model has 64K RAM (not expandable) and 62 typewriter-style keys. Included are a HELP key, an international character set, and 29 graphics characters. BASIC is built in to the 800XL, an improvement over the Atari 800, which required a plug-in cartridge. All of the more than 2,000 programs written for other Atari computers will run on the 800XL, in cassette tape, disk, or cartridge format. There are over 1,000 factory-authorized Atari service centers in the U.S.

SV-318

MANUFACTURER: Spectravideo Inc., 39 W. 37th St., New York, NY 10018; (212) 869-7911
PRICE: $300

The most innovative feature of the new SV-318 computer, the first market entry from Spectravideo, is its built-in keyboard joystick. The joystick, designed primarily for game playing, can also be used to control cursor movement. Besides its full range of regular typewriter keys, the SV-318 has 10 function keys. You can change the function of these keys so that they implement the most frequently used commands, such as LIST or RUN. The keys, however, are made of flat rubber, and are thus less efficient for extended typing than concave typewriter keys.

The SV-318, with its sizable 32K ROM built-in memory, has solid sound and graphics capabilities, and can run CP/M programs. This gives the user a large library of business-oriented programs to choose from. Coleco video game cartridges also fit into the SV-318's cartridge slot. The computer has ports to accept all types of peripherals, and its 32K RAM is expandable to 256K.



Timex Sinclair 1500

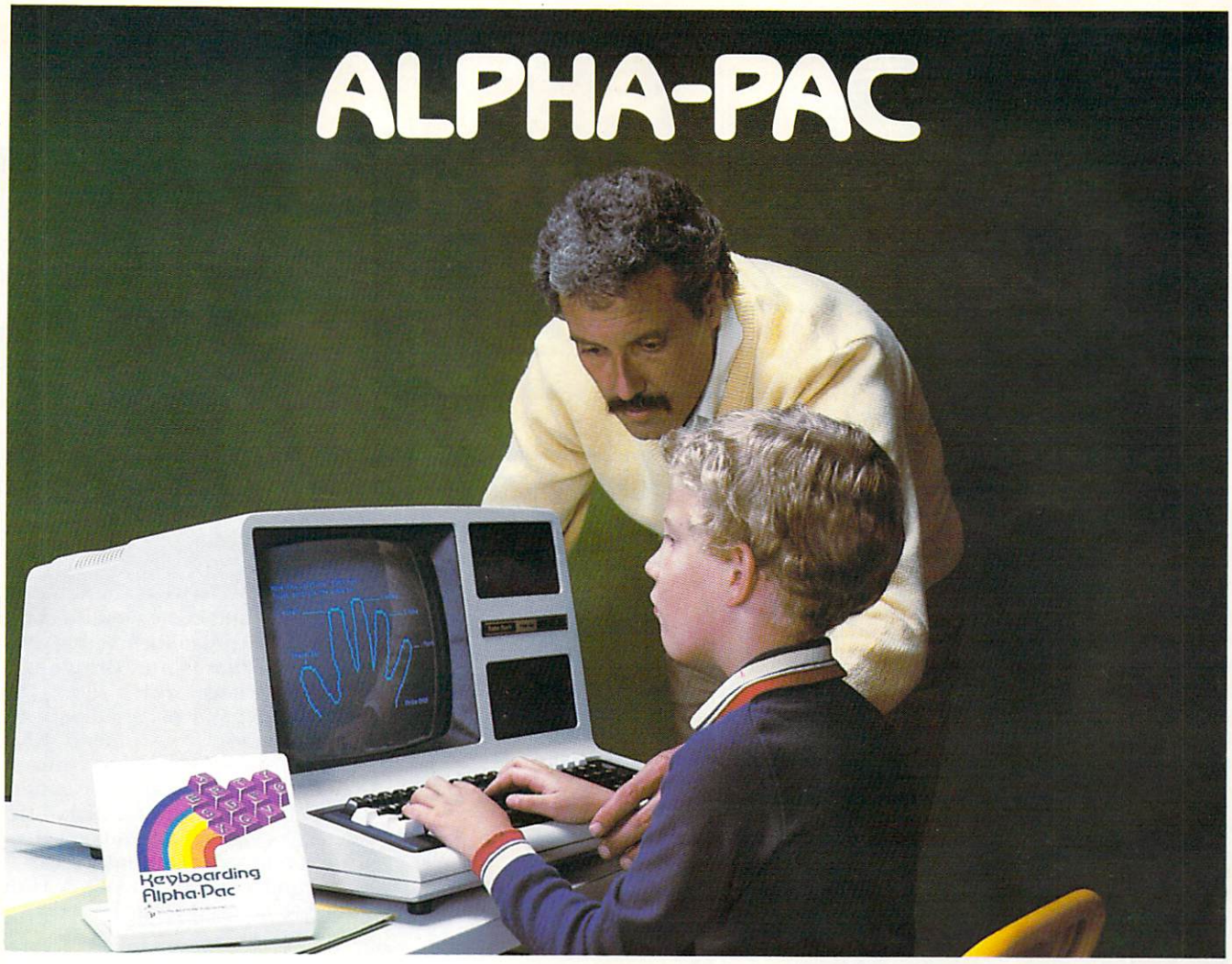
MANUFACTURER: Timex Computer Corp., P.O. Box 2655, Waterbury, CT 06720; (203) 573-5000
PRICE: $79

The little Timex Sinclair 1500 comes equipped with 16K RAM, which can be expanded to 32K. In contrast with the flat-membrane keyboard of the TS1000, the TS1500 has 40 full-movement keys, including 22 graphics characters. The TS1500 also features the "one touch" key-word entry, first introduced on the TS1000. This allows the user to enter commands, such as LIST or RUN, by touching one key, instead of typing out the whole word. The screen display is black and white.

The TS1500 is compatible with the library of several hundred software programs and all the peripherals available for the TS1000, including the TS 2040 printer. The new computer is designed to be used with a TV and a cassette recorder or cartridges, and can be hooked up to a modem for telecommunications. Timex says it will introduce this modem later this year.

continued on page 102

**These products have been announced by manufacturers, but are not necessarily in the stores yet. Some products may still be in the development stage. Call the manufacturer for expected date of delivery.*



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WHAT'S IN STORE
NEW HARDWARE

continued from page 100

PRINTERS

CX 4800 Printer/Plotter

MANUFACTURER: Leading Edge Products, Inc., 225 Turnpike St., Canton, MA 02021; (800) 343-6833
PRICE: $695

This printer/plotter can draw circles, arcs, and lines—in four colors. Black, red, blue, and green ballpoint pens are standard, but the owner can opt for different colors. Six user controls tell the printer what direction to move in and when to switch pens (colors). The CX 4800 also works as a letter-quality printer, but it prints only eight characters per second.

IMPACT "40" Printer

MANUFACTURER: Fidelity Electronics, Ltd., 8800 NW 36th St., Miami, FL 33178; (305) 888-1000
PRICE: $160

Designed to connect directly to the VIC-20 and Commodore 64 computers, the IMPACT "40" printer produces a 40-character line in black or red. The dot-matrix printer uses ordinary adding-machine roll paper, which is 2.75 inches wide. It prints at 65 characters a second.

Microline 82A

MANUFACTURER: Okidata Corp., 111 Gaither Dr., Mt. Laurel, NJ 08054; (609) 235-2600
PRICE: $650

Speed, variety of type, and affordability are the main attractions of Okidata's Microline 82A. At 120 characters per second, the 82A prints 80 columns of standard characters or 132 of condensed print. The printer can also create bold or double-width characters. A graphics software package, included with the printer, allows for line graphs, charts, or pictures.

MONITORS

Gorilla Monitor

MANUFACTURER: Leading Edge Products, Inc., 225 Turnpike St., Canton, MA 02021; (800) 343-6833
PRICE: $99

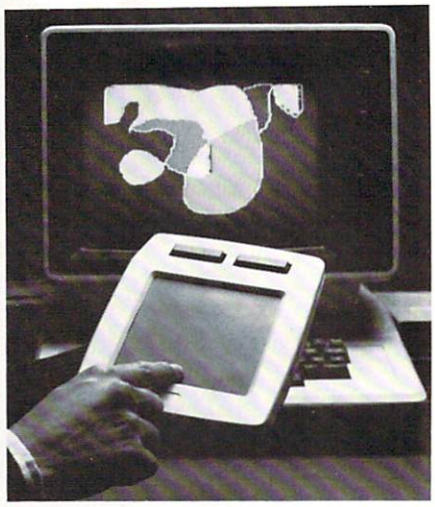
This high-resolution, green-screen, nonglare monitor can display a full 25 lines of 80 characters apiece. Leading Edge says that characters on the screen don't flicker, and that scrolling characters or darting spaceships won't appear smeared or streaky. A built-in tilt bracket lets the user adjust the monitor to a convenient angle.

MISCELLANEOUS

Koalapad Touch Tablet

MANUFACTURER: Koala Technologies Corp., 4962 El Camino Real, Suite 125, Los Altos, CA 94022; (415) 964-2992
PRICE: $125 (includes *Micro Illustrator Island Graphics* software package)

You can draw on this touch tablet with your finger or with a stylus, and create an image that appears immediately on the computer monitor. This sketch-pad method of drawing is much quicker and more flexible than using a keyboard to produce the same effects. The new Koala product can be used with Atari, Apple, IBM, and Commodore computers, and comes with a connecting cable. Also included is the *Micro Illustrator Island Graphics* software package, which allows the user to select shapes, shadings, and "paint brushes" from a menu. Koala offers additional game and educational software packages for about $50 each. This software, including a video coloring book, a music instruction program, animated cartoons, and a graphics tool kit, is designed to be used with the touch tablet.



Voice Box II

MANUFACTURER: The Alien Group, 27 W. 23rd St., New York, NY 10010; (212) 741-1770
PRICE: $169

The Voice Box II, a programmable speech synthesizer, converts typed or stored text into speech and/or sound effects. The Voice Box comes in two models—one for the Atari (shown here), which plugs into a serial port, and one for the Apple ($215), in the form of a card that fits into a slot in the back of the computer. The Voice Box can be programmed to pronounce foreign languages, and sound effects.

With additional software, the Voice Box can give language lessons, teach grammar, dictate a poker game, and sing Beatles songs. Users can alter the lip movements, tone, and speed of the "talking face" that appears on the monitor.

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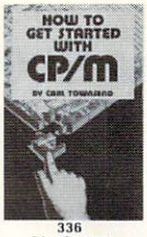

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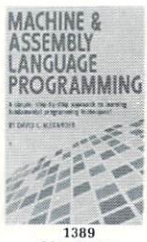

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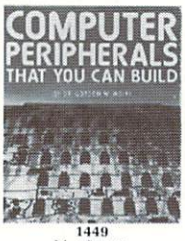

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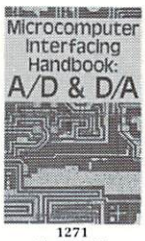

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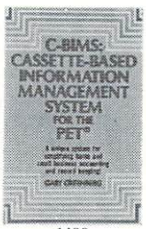

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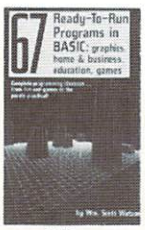

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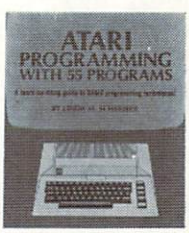

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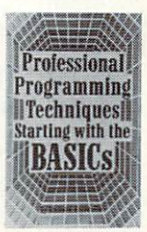

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NOVELTIES

COMPUTERS ON THE HIT PARADE

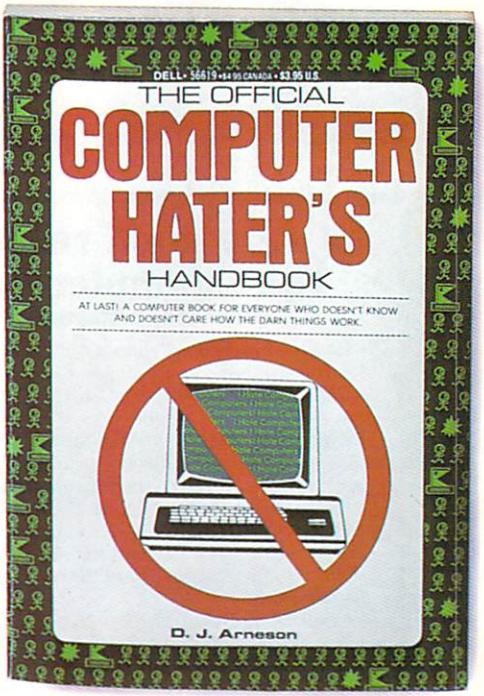
It may not make the Top 40, but *Everything You Always Wanted to Know About Home Computers* should be a hit with recent and prospective home computer owners. Comic couple Steve Allen and Jayne Meadows have teamed up again, but this time they're playing it straight on an album that introduces and demystifies the basics of buying, using, and programming home computers. The dialogue on this disk is plain and simple; the accompanying booklet equally straightforward. Available at both record shops and computer stores on Casablanca records and tapes.

APPLE HARVEST

This autumn's Apple Collection catalog features a bushel of handsome computer-related gifts, most of which are polished off with the celebrated rainbow Apple logo. If you're looking for that great apple in the sky, there's a colorful dragon-tail kite, a full 25-feet long, made of ripstop nylon ($27). The 100 percent cotton jersey with kangaroo pouch pocket, which comes in royal blue, jade, and red, will ward off the winter chills when you're playing football instead of *Frogger* ($31). Among the many desktop items is a shiny brass stamp box ($27). And since even computer hackers get hungry, there's a wicker picnic basket complete with table cloth and cloth napkins ($45). To check out other items in the free catalog, contact The Apple Collection, P.O. Box 306, Half Moon Bay, CA 94019; (800) 227-6703; in California: (800) 632-7979.

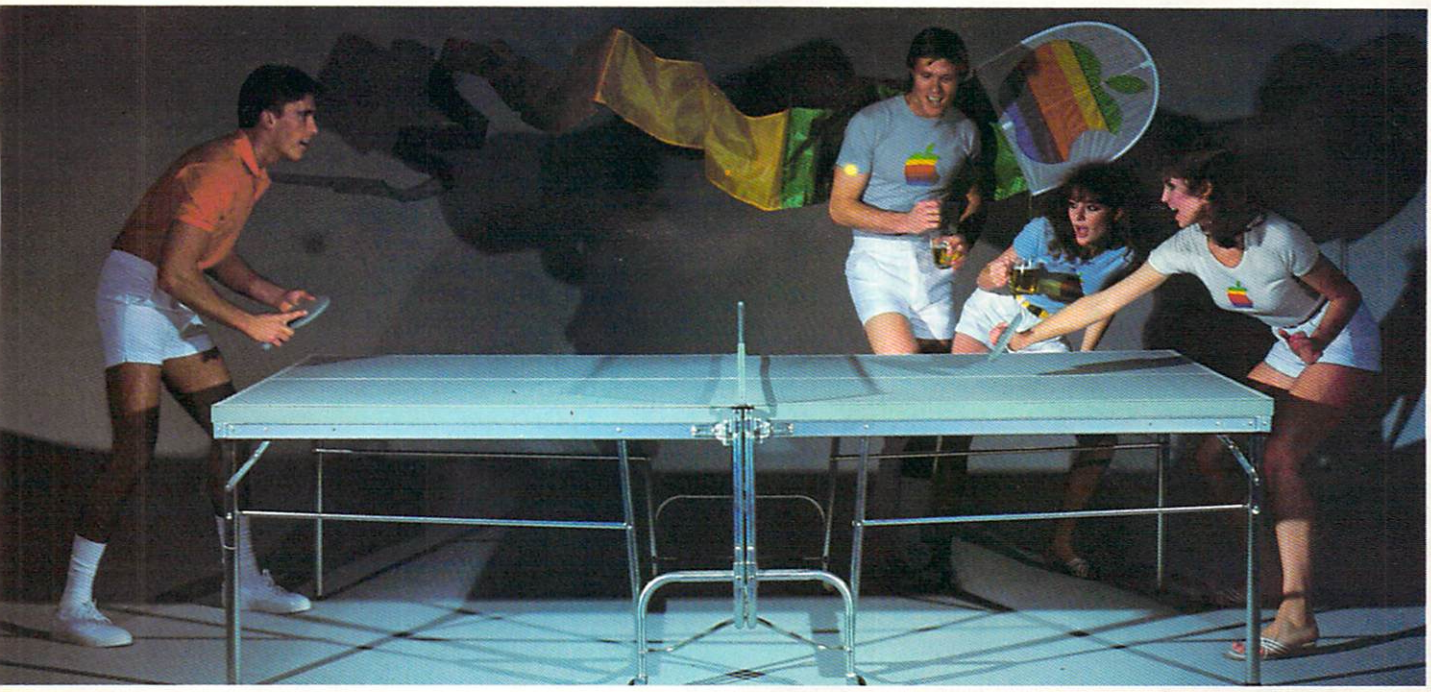
BYTING SATIRE

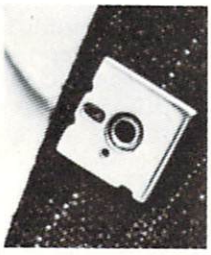
Flustered by the floppy disk? Reeling from too much RAM and ROM? Why not push the ESCAPE key and enjoy a few laughs with *The Official Computer Hater's Handbook?* Author D.J. Arneson, who poked fun at Oxford cloth and debutantes with his *Original PREPPY Jokebook* and *Cookbook*, now offers something for "everyone who doesn't know and doesn't care about how the darn things work." Actually, the handbook is especially amusing for those of us who know a little bit of the jargon and have already agonized over the distinction between bits and bytes. Some of the more entertaining sections include "How to Turn Off Computer Conversations," "Hope for the Hopelessly Addicted," and "Signs of Computer Use in School Age Children." The book also has a glossary that could set introductory computer courses back 10 years. For instance, Arneson defines a floppy disk as a "serious curvature of the spine." The Dell paperback is available at most major bookstores for $3.95.



GIZMOS & GADGETS & NOTIONS

TECHNIGRAPHICS/LORENE LAVORA



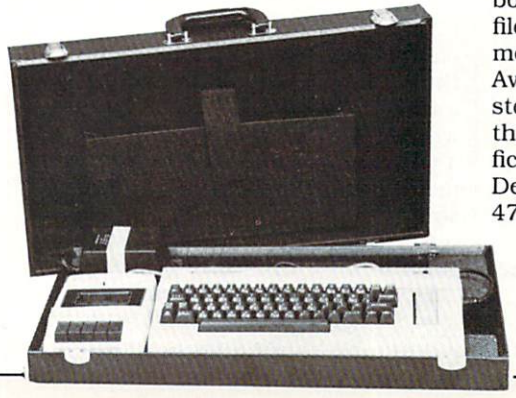


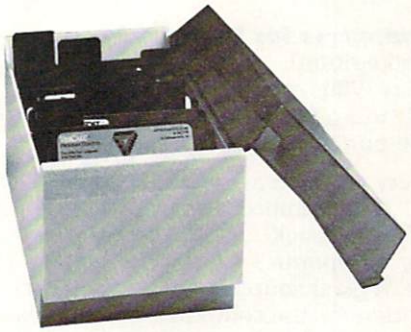
DISKETTES OF DISTINCTION

Some wear their hearts on their sleeves, so why not wear a diskette on your lapel and advertise your technological savvy? One-half-inch-square diskettes mounted on lapel pins, tie tacks, and stick pins are available in gold or silver vermeil ($12 or $10). For the crowning touch, ask about custom-made 14- or 18-carat versions, with or without diamonds and rubies. Add $2 shipping and handling when ordering from MCN, Inc., Computer Jewelry, P.O. Box 9393, Simms Center, San Rafael, CA 94901; (415) 453-7033.

HAVE COMPUTER, WILL TRAVEL

Keep your computer comfy in transit—on business trips, vacations, even to grandmother's house. Durable luggage with Velcro straps and foam pads inside to secure hardware protects your computer from bumps and bruises. Cases are available for most major models; prices range from $49 to $139, depending on size. Check your local computer store or contact the manufacturer directly: Computer Case Company, 5650 Indian Mound Ct., Columbus, OH 43213; (800) 848-7548.





SOFTWARE HOUSING

Sleep soundly with your diskettes tucked away safely in this sturdy file box. Made of molded plastic, these files come in putty or black and hold more than 150 5¼-inch diskettes. Available for $25.95 at stationery stores or, with UPS charges, through the manufacturer—Evco Office Products, 100 W. North Street, De Forest, WI 53532; (608) 846-4722.

WHAT'S IN STORE
BOOK REVIEWS

The Complete Handbook of Personal Computer Communications

Alfred Glossbrenner
St. Martin's Press, 1983
348 pp., softcover, $14.95

Few of us realize that we are acquiring a powerful communications tool when we buy a home computer. It contains a universe of information, unimagined services, and communications potentials. All one needs is a modem, a serial interface, and communications software to open this world for exploration.

Anyone intrigued by the computer's vast communications possibilties will find Alfred Glossbrenner's *The Complete Handbook of Personal Communications* invaluable. Glossbrenner tells us everything about how to go "on line," and what we can get out of it when we do. He discusses in detail some of the major information, news, and service networks available to us, as well as many of the specialized services—computer bulletin boards, electronic shopping, and banking networks.

Glossbrenner reserves his technical discussions for the final chapter, which rounds out this informative book along with a number of comprehensive appendices.

—STAN GOLDBERG

Computers for Everybody

(2nd edition)
Jerry Willis and Merl Miller
Dilithium Press, 1982
186 pp., softcover, $7.95

Every vocation/avocation has its T.T.O. (Thumbed Through Often) reference book . . . *The Joy of Cooking, Chapman's Book of Piloting,* etc. A good source of standard information for the computer novitiate is *Computers for Everybody,* a buyer's guide dedicated to helping you purchase a home computer.

The first half of the book contains a pinch of computer history, a tantalizing list of what computers can do and how they can be used, and a smattering of essential software and hardware guidance. The second half is an extremely up-to-date (but not for long) guide to 40 popular computers and their peripherals. The writing is direct, informative, and sprinkled with interesting trivia. The use of clever cartoons makes the book even more readable.

However, it has its share of problems. The information is sketchy in places, overdone in others. There are so many buyer's guidelines that you almost need a computer to figure them out.

Nonetheless, Willis and Miller did their homework, and, as the title suggests, no matter how much you know, you'll learn something about computers from this book.

—ROBIN RASKIN

Katie and the Computer

Fred D'Ignazio,
Creative Computing Press, 1979
38 pp., hardcover, $8.95

Author Fred D'Ignazio, to quote from his biography, "believes that the computer should be introduced to children as a wonderful tool, rather than as a forbidding electronic device." His little book, *Katie and the Computer,* sets out to teach basic computer concepts by letting the young reader follow Katie through a fantasy adventure in Cybernia, a world inside the machine.

Like Lewis Carroll's *Alice in Wonderland,* D'Ignazio's book reveals deep logic through whimsy and wordplay. Normally abstract and difficult ideas—the operating system, binary math, bits and bytes, and programming errors—are transformed into engaging characters and their significance made apparent through exciting and humorous narrative. Young children delight in the story, and Stan Gilliam's profuse and colorful illustrations can help slower readers to follow the plot on their own. The book would be best read by parent and child together, preferably with a home computer at hand. Even the most computer-sophisticated adult will find something to laugh at in *Katie.*

—JOHN B. JAINSCHIGG

Pilgrim in the Microworld

David Sundow
Warner Books, 1983
240 pp., hardcover, $15.50

If you're an avid computer game player, this eloquent glimpse into the soul of a video gamer will strike a responsive chord. But for those who've never experienced the joys of a joystick, the book reads like the maniacal diary of an obsessive person. In either case, it offers insights into the aesthetics of the computer game.

Devoid of character, plot, and dialogue, *Pilgrim* nevertheless reads like a novel. Sundow's style is versatile, informed, perceptive, lyrical, and undogmatic. Rather than looking at the sociological phenomena of video games, he gives us the personal story of his attempt to triumph over a single video arcade game—Atari's *Breakout.*

Sundow has done for the arcade game what Robert Pirsig's *Zen and the Art of Motorcycle Maintenance* did for the Honda. The game is the vehicle; the destination is an intimate knowledge of the inner self.

—ROBIN RASKIN

FC's Home Library

Of the many computer books on the market, some are fast approaching classic status. Not all the information in them is new, but it may be new to you. Here are a few that deserve special note:

THE MICRO MILLENIUM, Christopher Evans. Washington Square Press, 1979. 308 pp., paperback, $3.95. This book readably traces the computer's history and fancifully maps its future, discussing the benefits and problems computers pose to culture and civilization.

MINDSTORMS: CHILDREN, COMPUTERS, AND POWERFUL IDEAS, Seymour Papert. Basic Books, 1980. 230 pp., paperback, $6.95. Informative, profound, if somewhat technical study examines the potential of computers, and, specifically, LOGO language to "provide children with new possibilities for learning, thinking, and growing emotionally."

THE PERSONAL COMPUTER BOOK, and THE WORD PROCESSING BOOK, Peter McWilliams. Prelude Press, 1982. 300 pp. & 319 pp., softcover, $9.95 (both books). Witty, comprehensive introductions for the "absolute novice" include delightful illustrations and, most important, buyer's guides based on McWilliams's frank appraisal of machines on the market, with periodic complementary updates.

THE SOUL OF A NEW MACHINE, Tracy Kidder. Avon Books, 1982. 293 pp., paperback, $3.95. Fascinating, Pulitzer Prize–winning account of the invention and development of a business-type microcomputer also profiles the team of engineers behind its creation. FC

ADVERTISER'S INDEX

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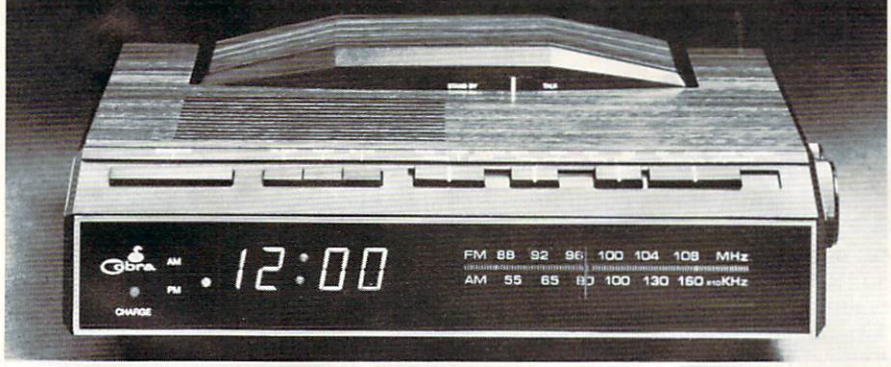

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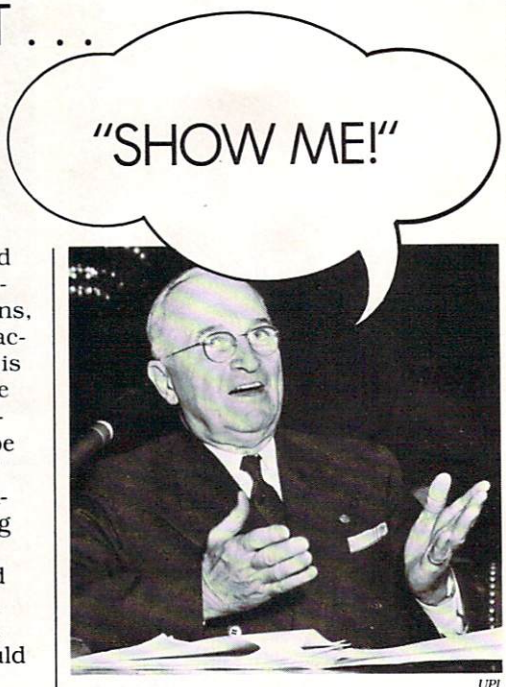
SIGN OFF

IF YOU DON'T UNDERSTAND, SHOUT . . .

BY EDWARD ROSENFIELD



UPI

Imagine yourself in a computer store. Next to you stands a salesperson, babbling on about RAM, ROM, and RUN. Do you interrupt this stream of computerese and insist on a language you can understand? Or do you smile weakly, timidly nod your head in agreement, and leave the store sure of only one thing: "Something must be wrong with me. I didn't understand a word."

Now picture Harry Truman in the same computer store with the same incomprehensible salesperson. After several minutes, Harry can't take it anymore and suddenly shouts, "Show me!" People turn around and stare. The salesperson is dumbfounded. Nobody has ever demanded *that*.

But it's time to start making demands; it's time to change our attitudes. No one should have to play the role of the intimidated customer hovering in the corner. We need to take the stance of Harry Truman and his fellow Missourians and insist "Show me!" every time a computer baffles us.

Odds are that the most important change to come in the world of computing will not be a change in programming language, or a new kind of machine. Instead, it will be a change in our attitude. Stop thinking, "Something must be wrong with me." Start thinking something must be wrong with *them*, the people who are making computers incomprehensible to us, the average users. After all, we are the new wave of computer buyers.

How can computer manufacturers begin to get the idea that things so far have been needlessly difficult for the average person? The first step is not to let computer salespeople intimidate you. It may make their jobs easier if you're afraid to ask questions—or accept answers you're too embarrassed to admit you don't understand—but it won't help you make the right decisions.

If salespeople find they are forced to spend more time with their customers in order to answer questions, they will help pressure the manufacturers to produce equipment that is easier to sell. Our attitude must be clear: "Explain this to me in a language I can understand and maybe I'll end up buying this computer."

Unfortunately, you can't even expect smooth sailing once you bring the computer home. When you sit down with your new purchase and open up the user's manual, watch out. Your self-esteem might take a quick plunge—and your anger could rise.

That brings you to the second step to improved relations between the consumer and the computer manufacturer: Take the initiative and communicate any frustrations you had setting up and operating your new computer.

Many operating manuals are written in a way that seems designed to test our patience. Don't blame yourself when you can't recognize a word in the first sentence. Remember that "bits" and "bytes" and "baud rates" are not common household words that have somehow escaped your family's vocabulary. If it makes you feel better, go ahead and hurl the instruction pamphlet across the room in exasperation. But before you blame yourself for your seeming ineptitude, ask yourself: "Are these instructions comprehensible?" If they're not, write a letter to the manufacturer.

The only way to change the situation most consumers encounter is to speak up now. Demand clarity, every step of the way. Such demands will certainly reorient salespeople, and, ultimately, will be communicated to manufacturers who are anxious to know what people want.

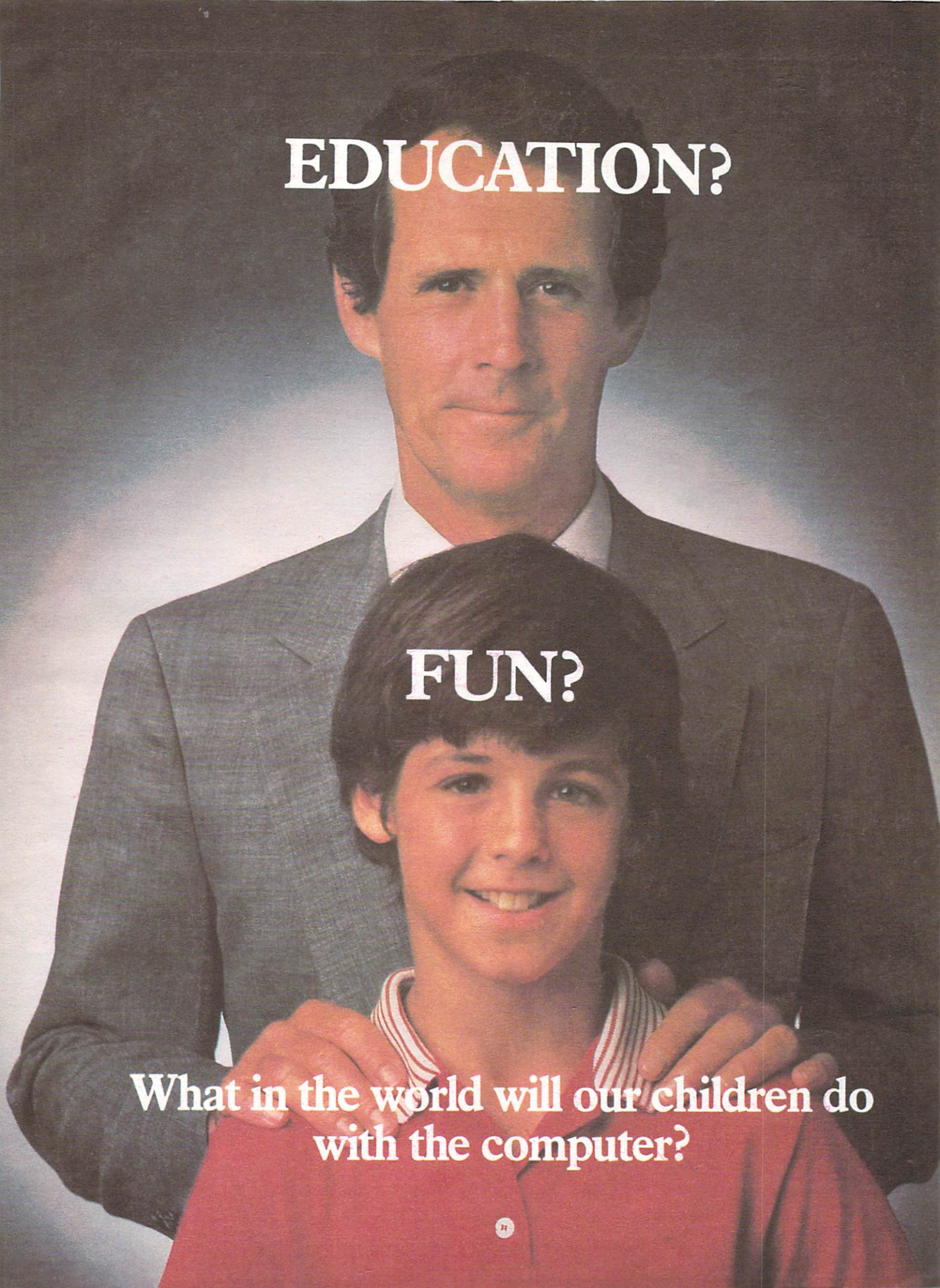
Start speaking up in these pages. Write to FAMILY COMPUTING and explain what you need from your computer and accessories. It's up to all of us to make sure we get machines that are easy to use, forgiving of human foibles and mistakes, and well documented. If we start demanding such changes now, computer makers will deliver—and soon. FC

EDWARD ROSENFELD *is a communications consultant to major corporations, and is creative director of Video Music Arts, in New York.*

IT'S ONLY A COMPUTER

After battling all the technological jargon and computerese, it's easy to lose sight of what computers are and what they're good for. Here's a list of things to keep in mind.

1. The computer is a machine.
2. The computer is made by humans.
3. Turn off a computer, and it usually forgets everything it's ever been told.
4. Computers know only what we have told them; therefore computers are only as smart as the person who programs them.
5. You control the computer, and teach it to control whatever you want: your family budget, your home security, a new home business, etc.
6. Computers do things very quickly. This can mean more time for you.
7. Computers are just another step in the evolution of communications.
8. Computers are only frightening because they're so new. Soon we will be using them as easily and naturally as we pick up the telephone.
9. The first computers, like the first calculators, were enormous. Now calculators fit in a pocket; so do some computers.
10. It's never too early—or too late—to start using computers.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FUN?
What in the world will our children do with the computer?

ENTER A FANTASTIC WORLD OF FUN *AND* LEARNING! WITH

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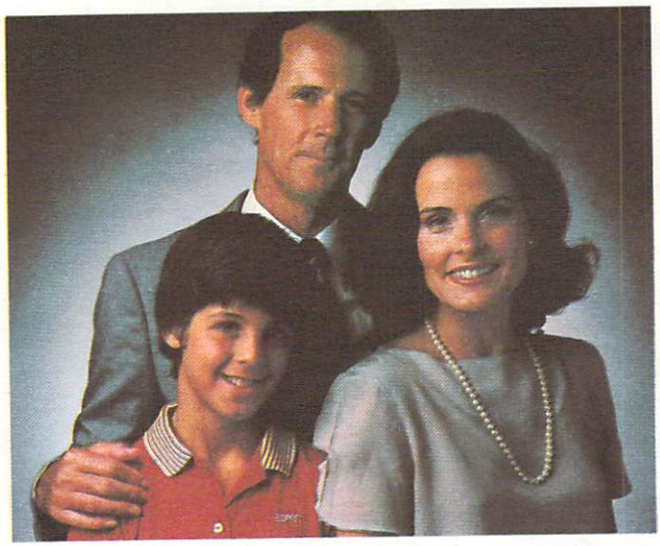
from Scholastic



1. WHAT IN THE WORLD IS A "MICROZINE?"

Microzine is an interactive magazine on a computer disk, and it can open up the world of computer learning to your children *more effectively than any other children's software available today.* Microzine comes to you from Scholastic. We've been trendsetters in children's publishing for over 60 years. Now that traditional teaching methods are being enhanced by computer-taught materials, Scholastic is ready with the innovation that creates an ongoing "dialogue" of fun and learning between your children and your computer. Like a magazine, but unlike other software for children, Microzine is constantly current and topical. Your children receive a new four-program Microzine disk every other month and build their own Microzine Library!

2. WHAT CAN YOUR CHILDREN DO WITH MICROZINE?

Microzine can help your 9-13-year-olds take advantage of one of the most important uses your computer can have: exploring new and more efficient ways of learning and thinking. (If you don't own a computer, your children may be able to use one at school or a friend's home, or borrow one from your local public library.)

Microzine was created with the recognition that today's children take naturally to computers and that tomorrow's adults will need to be computer literate—no matter what their careers.

3. WHAT IS "COMPUTER LITERACY" AND HOW DOES MICROZINE HELP ACCOMPLISH IT?

At Scholastic, we believe that learning how to utilize a computer's wide-ranging capabilities should be an important part of every child's education. This kind of computer literacy is no longer an option, but a necessity, if our children are to take their places in the computer age. To this end, Microzine is designed to spark enthusiasm and teach these essential skills:

- ★ following directions
- ★ vocabulary
- ★ what a computer can do
- ★ learning to use a computer
- ★ the nature of programming
- ★ using the keyboard
- ★ everyday applications
- ★ word processing
- ★ data handling
- ★ graphics
- ★ logic
- ★ parts of a computer
- ★ problem solving

4. WHAT WILL THE FIRST YEAR OF MICROZINE BRING?

An ever-expanding library of fun and learning!
Every eight weeks there are four full-length programs and the variety is incredible:

Who's that trying to solve the *Mystery at Pinecrest Manor,* lost in the *Northwoods Adventure* and challenging the far reaches of space on *Mission to Planet XII?* Could it be someone we know? (With Microzine, *anything* is possible.) All set for takeoff on the *Space Shuttle*— or maybe a hot air balloon race? Wow! (Will Microzine *ever* get down to Earth?)

Back safe on Planet Earth, visit the *Pet Store.* "A flamingo for your bathtub? Or maybe a rare three-humped camel?"

Too wild? *Gift Store* offers practical suggestions for everyone from Great Uncle Oscar to your 16-year-old twin sisters. Or explore your creative options by composing a song, writing and illustrating a book, or inventing your own game.

Microzine is *always* full of questions. If you've ever dreamed of talking to a computer game designer, *Ask Me* gives you the chance. You won't believe all the current big stars waiting to ask you questions, too.

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Hicksville, NY 11802

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Thereafter, pay only $24.95, plus shipping and handling, for each Microzine you accept.
You save nearly 40% off the retail price by subscribing!

Each bimonthly Microzine Package contains; a Microzine Floppy Disk with Four Complete Programs.

On your first disk, discover:

1. POSTER. What's two spaces wide, slow, green and silent—and changes to three spaces wide, fast, pink and squeaky? It's an imaginary paintbrush that lets you create as many colorful posters as you want!

2. SECRET FILES. If your children want to remember who starred in their favorite horse movie of 1982, they need Microzine's electronic filing system. It works just like the electronic filing systems adults use.

3. ASK ME. Robert Macnaughton of "ET" fame is standing by to accept questions—and ask a few of your children in return!

4. HAUNTED HOUSE. There's never been a haunted house so funny—or one so willing to let you plan your own visit! Like all Twistaplots,® this one ends differently every time you venture inside.

NOTE: The first Microzine Package also contains a bonus: *a separate data disk that can be used to save original posters and other personal creations!* (A $4.95 value.)

The Microzine Handbook

After consulting this monthly step-by-step guide written in plain English for users 9-13, your children will be able to show *you* how Microzine activities work. Easy-to-follow instructions encourage independent work habits, creative thinking and follow-through.

Microzine™

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FOR APPLE COMPUTERS.

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☐ Please send us Microzine #1 (featuring Poster, Secret Files, Ask Me and Haunted House) and enter a Charter Subscription to Microzine for the child named below. Bill me the special introductory price of just $7.95 (plus shipping, handling and any applicable sales tax). We will be billed $24.95 (plus delivery) for every Microzine we keep. After purchasing Microzine #1, we are never obligated to buy even one additional Microzine, and we may cancel our subscription at any time. If we are not delighted with the introductory Microzine, we may return it within 10 days and pay nothing.

☐ I've already purchased Microzine #1. Please start our subscription with Microzine #2, for which I will be charged just $7.95 (plus shipping, handling and any applicable sales tax). 61010 09

Child's Name_____ Age_____ Grade_____
(please print)

Address_____ Apt._____

City_____ State_____ Zip_____

Telephone No. (_____)_____

Parent's Signature_____

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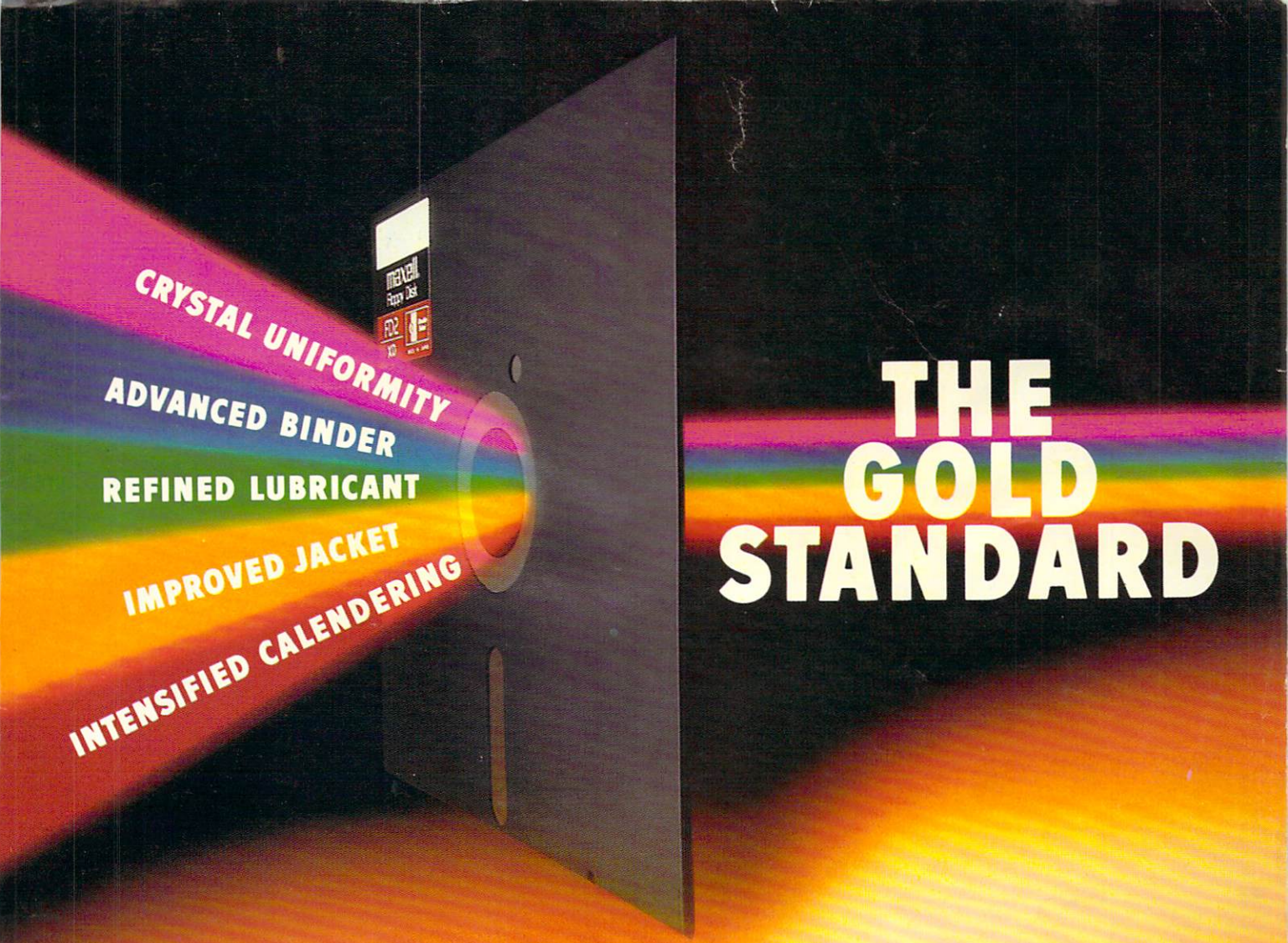

THE GOLD STANDARD

You can wait for industry standards to mandate improved performance. Or you can have it now on Maxell. The Gold Standard.

The refinements of The Gold Standard, from oxide particles to lubricant to jacket, are uniquely Maxell. And therefore, so are the benefits.

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An advanced binder bonds oxides to the base material preventing time and money-wasting dropouts. Calendering then smooths the surface for a read/write signal that stays clear and accurate. And lubricants reduce friction between head and disk for a longer media and head life. To house it, we then constructed a new jacket heat-resistant to 140° F to withstand drive heat without warp or wear. And created the floppy disk that leads the industry in error-free performance and durability.

All industry standards exist to assure reliable performance. The Gold Standard expresses a higher aim: perfection.

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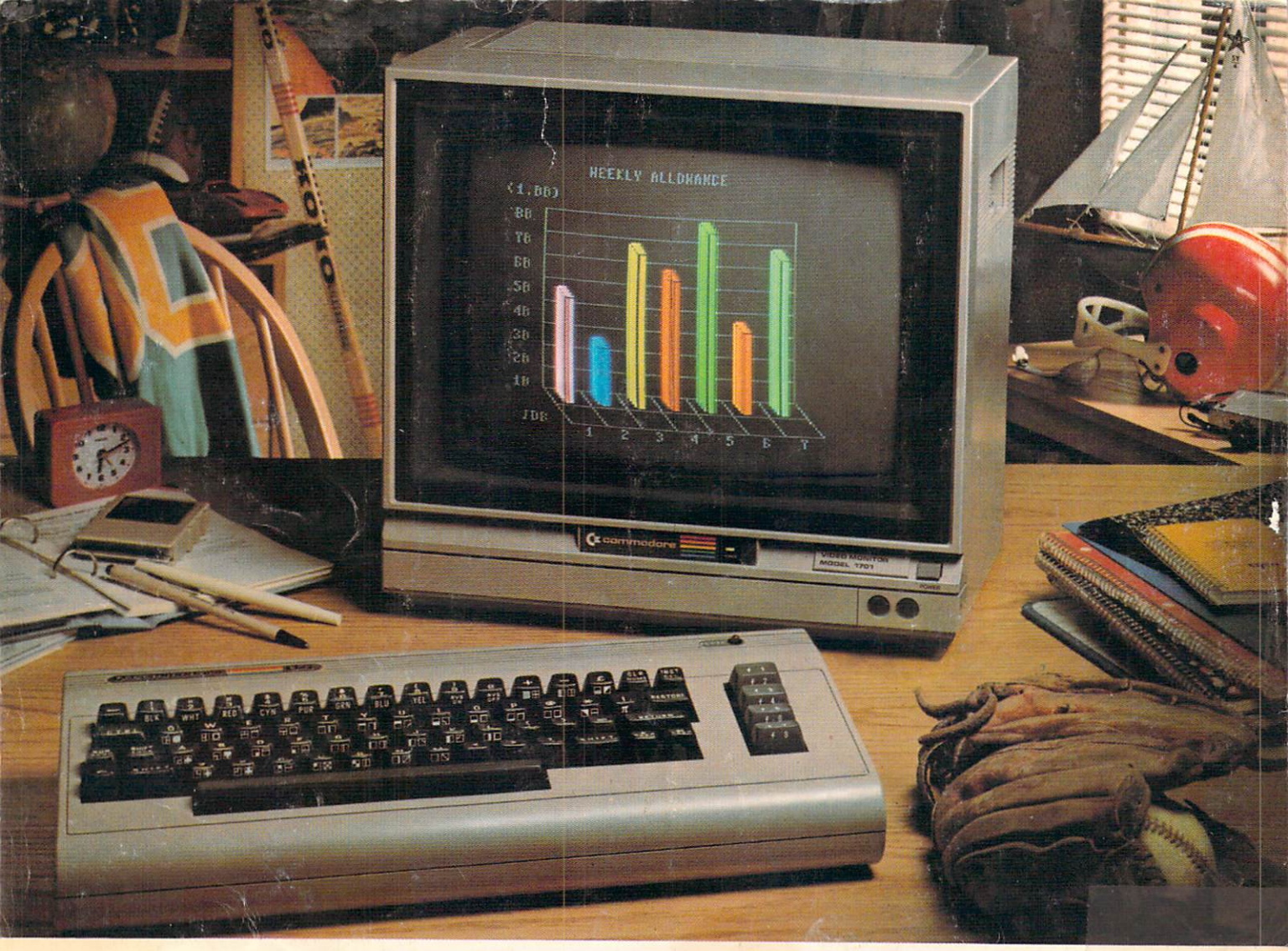
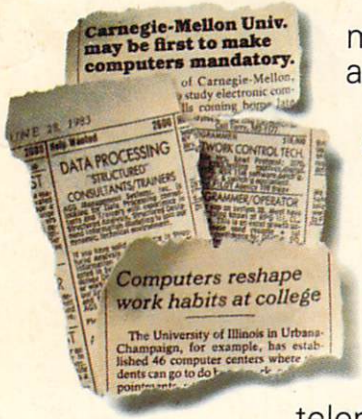


INSTEAD OF SAVING FOR YOUR KID'S EDUCATION, MAYBE YOU SHOULD BE SPENDING FOR IT.

We'd be the first to encourage parents to save for their kids' education. But money alone isn't enough to get anybody into college. Let alone through it.



At more and more colleges today, computer skills are becoming mandatory. And at some colleges, those skills are required for admission itself.

But with saving for tuition and room and board, who has money for computers? One answer is the Commodore 64.™

The Commodore 64 gives you a powerful 64K memory. That's as much memory as either the Apple® IIe or the new IBM® Personal Computer. But at far less than half the cost.

You also get full-color graphics, a nine-scale music synthesizer, and a wide range of software.

The Commodore 64 interfaces with all the peripherals you could want for total personal computing: disk drives, printers, and a telephone modem that's less than $100.

The combination of power, graphics, music, and software makes it the perfect computer for a student to start out with. And stay with right through college.

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